Effective Health Care Program

Comparative Effectiveness Review
Number 59

Screening for Glaucoma: Comparative Effectiveness

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Screening for Glaucoma: Comparative Effectiveness

Prepared for:
Agency for Healthcare Research and Quality
U.S. Department of Health and Human Services
540 Gaither Road
Rockville, MD 20850
www.ahrq.gov

Contract No. 290-2007-10061

Prepared by:
Johns Hopkins University Evidence-based Practice Center
Baltimore, MD

Investigators:
Ann-Margret Ervin, Ph.D., M.P.H.
Michael V. Boland, M.D., Ph.D.
Elliott H. Myrowitz, O.D., M.P.H.
Jack Prince, O.D.
Barbara Hawkins, Ph.D.
Daniela Vollenweider, M.D.
Darcy Ward
Catalina Suarez-Cuervo, M.D.
Karen A. Robinson, Ph.D.

AHRQ Publication No. 12-EHC037-EF
April 2012

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The information in this report is intended to help health care decisionmakers—patients and clinicians, health system leaders, and policymakers, among others—make well-informed decisions and thereby improve the quality of health care services. This report is not intended to be a substitute for the application of clinical judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical reference and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances presented by individual patients.

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None of the investigators has any affiliations or financial involvement that conflicts with the material presented in this report.

Suggested citation: Ervin AM, Boland MV, Myrowitz EH, Prince J, Hawkins B, Vollenweider D, Ward D, Suarez-Cuervo C, Robinson KA. Screening for Glaucoma: Comparative Effectiveness. Comparative Effectiveness Review No. 59. (Prepared by the Johns Hopkins University Evidence-based Practice Center under Contract No. 290-2007-10061.) AHRQ Publication No. 12-EHC037-EF. Rockville, MD: Agency for Healthcare Research and Quality. April 2012. www.effectivehealthcare.ahrq.gov/reports/final.cfm.

Preface

The Agency for Healthcare Research and Quality (AHRQ) conducts the Effective Health Care Program as part of its mission to organize knowledge and make it available to inform decisions about health care. As part of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, Congress directed AHRQ to conduct and support research on the comparative outcomes, clinical effectiveness, and appropriateness of pharmaceuticals, devices, and health care services to meet the needs of Medicare, Medicaid, and the Children's Health Insurance Program (CHIP).

AHRQ has an established network of Evidence-based Practice Centers (EPCs) that produce Evidence Reports/Technology Assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care. The EPCs now lend their expertise to the Effective Health Care Program by conducting Comparative Effectiveness Reviews (CERs) of medications, devices, and other relevant interventions, including strategies for how these items and services can best be organized, managed, and delivered.

Systematic reviews are the building blocks underlying evidence-based practice; they focus attention on the strength and limits of evidence from research studies about the effectiveness and safety of a clinical intervention. In the context of developing recommendations for practice, systematic reviews are useful because they define the strengths and limits of the evidence, clarifying whether assertions about the value of the intervention are based on strong evidence from clinical studies. For more information about systematic reviews, see www.effectivehealthcare.ahrq.gov/reference/purpose.cfm.

AHRQ expects that CERs will be helpful to health plans, providers, purchasers, government programs, and the health care system as a whole. In addition, AHRQ is committed to presenting information in different formats so that consumers who make decisions about their own and their family's health can benefit from the evidence.

Transparency and stakeholder input are essential to the Effective Health Care Program. Please visit the Web site (www.effectivehealthcare.ahrq.gov) to see draft research questions and reports or to join an email list to learn about new program products and opportunities for input. Comparative Effectiveness Reviews will be updated regularly.

We welcome comments on this CER. They may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850, or by email to epc@ahrq.hhs.gov.

Carolyn M. Clancy, M.D.
Director, Agency for Healthcare Research and Quality

Jean Slutsky, P.A., M.S.P.H.
Director, Center for Outcomes and Evidence
Agency for Healthcare Research and Quality

Stephanie Chang, M.D., M.P.H.
Director, EPC Program
Center for Outcomes and Evidence
Agency for Healthcare Research and Quality

Shilpa Amin, M.D., M.Bsc., FAAFP
Task Order Officer
Center for Outcomes and Evidence
Agency for Healthcare Research and Quality

Acknowledgments

The Evidence-based Practice Center thanks Bradley Hickey, Anna Diller, and Yohalakshami Chelladurai for their assistance with reviewing articles.

Key Informants

Ross J. Brechner, M.D., M.S., M.P.H.
Lead Medical Officer National Coverage & Analysis Group
Centers for Medicare & Medicaid Services
Catonsville, MD

Anne Coleman, M.D.
Ronald Reagan UCLA Medical Center
Representative from the American Glaucoma Society
Los Angeles, CA

Murray Fingeret, O.D., FAAO
State University of New York College of Optometry
Department of Veterans Affairs
Representative from The Glaucoma Foundation
Hewlett, NY

Stephen A. Kamenetzky, M.D.
Washington University School of Medicine
Associate Medical Director, Blue Cross Blue Shield Missouri
St. Louis, MO

Paul P. Lee, M.D.
Department of Ophthalmology
Clinician/Representative from the American Glaucoma Society
Duke University School of Medicine
Durham, NC

Edith Marks
Glaucoma Support & Education Group
Patient/Representative from the Glaucoma Support and Education Group
New York, NY

Mildred Olivier, M.D.
Representative from the National Medical Association Midwest Glaucoma Center PC
Chicago, IL

Clifton L. Peay, M.D.
Clinician/Representative from the Roman-Barnes Society of Ophthalmology
Mechanicsville, VA

Bruce Prum, Jr., M.D.
University of Virginia Health System
Charlottesville, VA

Art Takahara
Patient/Representative from the Glaucoma Research Foundation
San Francisco, CA

Timothy Wilt, M.D., M.P.H.
Minneapolis Veterans Affairs Medical Center
University of Minnesota Department of Medicine
Representative of U.S. Preventive Services Task Force
Minneapolis, MN

Technical Expert Panel

Jennifer Burr, M.R.C.Ophth., D.O., M.Sc.
Centre for Healthcare Randomised Trials
Health Services Research Unit, University of Aberdeen
Aberdeen, UK

Murray Fingeret, O.D., FAAO
State University of New York College of Optometry
Department of Veterans Affairs
Hewlett, NY

Flora Lum, M.D.
H. Dunbar Hoskins Center
American Academy of Ophthalmology
San Francisco, CA

Peer Reviewers

Anne Coleman, M.D.
Ronald Reagan UCLA Medical Center
Los Angeles, CA

Rosanne Leipzig, M.D., Ph.D.
Mount Sinai School of Medicine
New York, NY

Flora Lum, M.D.
H. Dunbar Hoskins Center
American Academy of Ophthalmology
San Francisco, CA

Diana Petitti, M.D., M.P.H.
Arizona State University
Phoenix, AZ

Timothy Wilt, M.D., M.P.H.
Minneapolis Veterans Affairs Medical Center
University of Minnesota Department of Medicine
Minneapolis, MN

Linda Zangwill, Ph.D.
University of California, San Diego
Hamilton Glaucoma Center
La Jolla, CA

Screening for Glaucoma: Comparative Effectiveness

Structured Abstract

Objectives: Open-angle glaucoma (OAG) is the most common form of progressive optic neuropathy, and it is estimated that more than half of those who have glaucoma are undiagnosed. The objective of this review was to assess the effect of screening for OAG. We also summarized the accuracy of diagnostic tests.

Data Sources. We searched MEDLINE®, Embase, LILACS, and CENTRAL through October 6, 2011. We searched MEDLINE and CENTRAL (March 2, 2011) and screened an existing database to identify relevant systematic reviews.

Review Methods. We included studies of adult asymptomatic participants in general or high-risk populations. We included randomized controlled trials, quasi-randomized controlled trials, cohort studies, and case control studies. For diagnostic test accuracy, we included case control studies, designs in which tests were performed on all participants, and designs in which participants were randomized to one test. We included the outcomes of visual impairment, intraocular pressure, optic nerve damage, visual field progression, and harms as well as sensitivity and specificity of tests. For studies and systematic reviews, two reviewers independently assessed search results according to the inclusion criteria. One reviewer abstracted information and completed risk-of-bias assessment, and this was verified by a second reviewer.

Results. We excluded 167 of the 169 citations found in the search for systematic reviews. One systematic review evaluated the diagnostic accuracy of screening tests for OAG. A second review evaluated the effect of screening programs on the prevention of optic nerve damage. We identified 4,960 studies, of which 83 studies addressing the accuracy of screening tests were eligible. The sensitivity of standard automated perimetry (SAP) was higher than Goldmann tonometry, similar to the Heidelberg retina tomograph (HRT), and lower than disc photos or frequency doubling technology (FDT) visual field testing. The specificity of SAP was higher than disc photos and FDT, similar to HRT, and lower than Goldmann tonometry. Some comparisons of tests could not be performed due to variability in populations and reported thresholds. We identified no other studies.

Conclusions. We did not identify any systematic review or study that provided evidence for direct or indirect links between glaucoma screening and visual field loss, visual impairment, optic nerve damage, intraocular pressure, or patient-reported outcomes. Early treatment is important in determining the indirect chain of evidence for screening; the treatment of glaucoma is addressed in the report Treatment for Glaucoma: Comparative Effectiveness. There have been improvements in screening devices, yet there is limited evidence on the effects of screening for OAG.

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Executive Summary

Background

Glaucoma is a leading cause of visual impairment and blindness and affects approximately 60.5 million people worldwide.[1,2] Although glaucoma may be characterized by optic nerve damage, visual field loss, and elevated intraocular pressure, there is no consensus definition for confirming diagnosis.[3] Damage is irreversible, so early detection can prevent severe vision loss. Open-angle glaucoma (OAG), the most common subtype of the disease, affects more than 2.5 million people in the United States, with a median age-adjusted prevalence of 4.6 percent among black people and 1.6 percent among white people (based on year 2000 estimates).[4]

Unfortunately, it has been shown that only half of the prevalent cases of glaucoma have been identified in the United States due to at least two factors.[4] First, glaucoma is an asymptomatic disease that patients do not notice until the onset of advanced disease, accompanied by severe vision loss. Second, there is no single test to identify people with glaucoma, which has severely hampered the establishment of screening-based programs to detect the disease.

The March 2005 U.S. Preventive Services Task Force (USPSTF) recommendation addressing screening for glaucoma stated that there was "insufficient evidence to recommend for or against screening adults for glaucoma." The USPSTF noted that intraocular pressure measurement and optic nerve head assessment alone have limited effectiveness as population-based screening tools.[5,6] The USPSTF also concluded that methods used to assess visual field loss may be impractical for population-based screening due to the length of time required for testing and the challenge of equipment portability. Since 2005, there have been significant advances in the devices used to assess optic nerve structure and function,[5,6] with several published studies on new diagnostic tests, such as frequency doubling technology, used to assess visual field loss. Because of this new evidence, we believe that a re-evaluation of the safety and effectiveness of population-based glaucoma screening is warranted.

Objectives

The objective of this review was to summarize the evidence regarding the safety and effectiveness of screening-based programs for OAG, with a specific focus on the effects of screening on visual impairment, patient-reported outcomes, intraocular pressure, visual field loss, optic nerve damage, and adverse effects. The effect of screening on these outcomes is considered in the context of treatment of those who, after having been screened, are diagnosed as having glaucoma. This review also includes a summary of the diagnostic accuracy of screening examinations and tests for OAG.

Key Questions (KQs)

KQ1

KQ1a: Does a screening-based program for open-angle glaucoma lead to less visual impairment when compared with no screening program?

KQ1b: How does visual impairment vary when comparing different screening-based programs for open-angle glaucoma?

KQ2

KQ2a: Does a screening-based program for open-angle glaucoma lead to improvements in patient-reported outcomes when compared to no screening?

KQ2b: How do patient-reported outcomes vary when comparing different screening-based programs for open-angle glaucoma?

KQ3

What is the predictive value of screening tests for open-angle glaucoma?

KQ4

KQ4a: Does a screening-based program for open-angle glaucoma lead to reductions in intraocular pressure when compared with no screening program?

KQ4b: How does intraocular pressure vary when comparing different screening-based programs for open-angle glaucoma?

KQ5

KQ5a: Does a screening-based program lead to a slowing of the progression of optic nerve damage and visual field loss when compared with no screening program?

KQ5b: How do optic nerve damage and visual field loss vary when comparing different screening-based programs for open-angle glaucoma?

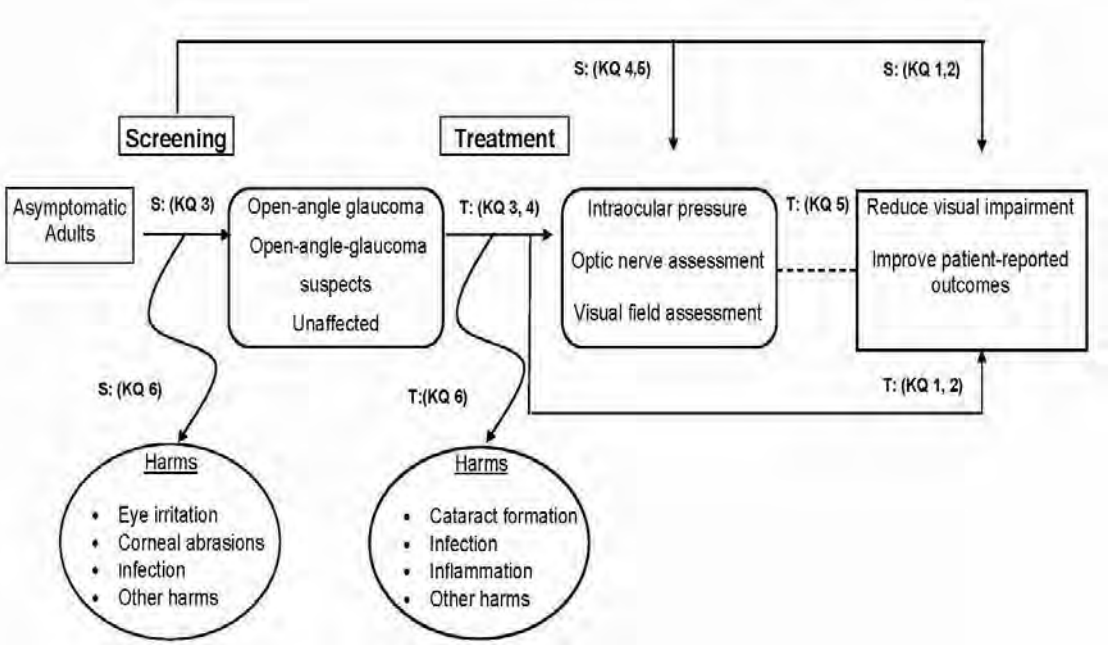
KQ6

What are the harms associated with screening for open-angle glaucoma?

Analytic Framework

The analytic framework (Figure A) depicts the impact of both screening and treatment for OAG. It depicts the KQs within the context of the inclusion criteria described in the following sections. The figure depicts how screening-based (S) programs, which may incorporate treatment when indicated, may reduce visual impairment (S: KQ1) and/or improve patient-reported outcomes (S: KQ2), reduce intraocular pressure (S: KQ4), and possibly slow the progression of optic nerve damage and/or visual field loss (S: KQ5). The figure also incorporates the potential predictive value of screening-based programs to detect OAG and people suspected of having OAG (S: KQ3). Finally, the potential for harms of screening (S: KQ6) are illustrated in the framework.

Figure A. Analytic framework for screening and treatment for open-angle glaucoma



KQ = Key Question; T = Key questions for the Comparative Effectiveness of Treatment for Glaucoma; S = Key questions for the Comparative Effectiveness of Screening for Glaucoma

Methods

Input From Stakeholders

The Agency for Healthcare Research and Quality (AHRQ) requested that the Johns Hopkins University Evidence-based Practice Center (JHU EPC) assist with the formulation and refinement of the Comparative Effectiveness Review (CER) topic, effectiveness of screening and treatment for glaucoma. In consultation with AHRQ, the JHU EPC investigators identified a small group of stakeholders to serve as members of a Key Informant Group. The Key Informant Group helped shape the KQs relevant to the topic by providing input regarding the populations and clinical subgroups; interventions; and outcomes of interest to clinicians, policymakers, payers, and consumers.

The EPC investigators incorporated the feedback of the Key Informants into a draft of the KQs, analytic framework, and inclusion criteria. A draft of the KQs was posted on the AHRQ Web site for public comment from April 22 to May 20, 2010. The investigators finalized the inclusion criteria after considering the public comments.

A Technical Expert Panel (TEP) was selected to provide broad expertise and perspectives specific to the topic. The TEP reviewed the proposed methodological approach for completing the CER and provided information to the EPC to aid in the refinement of the inclusion criteria and literature search strategies. The final protocol, titled The Comparative Effectiveness of Screening for Open-Angle Glaucoma, was posted to the AHRQ Web site on November 16, 2010.

Data Sources and Selection

We included randomized controlled trials (RCTs), quasi-randomized controlled trials, and observational study designs, including cohort and case control studies, for KQs 1 through 6. For

KQ3 we also included cross-sectional studies, study designs in which all tests (including the index, comparator, and reference standard) were performed on all participants, and designs in which participants were randomized to one test (among the index and potential comparator(s)) but all were evaluated with the reference standard.[7] We excluded case series of fewer than 100 participants, as studies smaller than this are expected to identify events occurring at a rate of less than 3 percent. We excluded conference abstracts that met our study inclusion criteria, as we did not have the resources to contact the study investigators with additional queries before the conclusion of data abstraction. We included systematic reviews that addressed the KQs. We excluded studies that addressed the following:

- Prevalence of glaucoma in a specific population, unless the studies also included tests of diagnostic accuracy
- Disease progression that did not include participants previously screened for glaucoma
- Risk factors for glaucoma

Types of Participants

We included studies of adult (as defined by included studies) asymptomatic participants in general or high-risk populations. For both populations we excluded studies of participants previously tested, diagnosed with glaucoma, or presenting with symptoms known to be related to a diagnosis of glaucoma. Asymptomatic high-risk populations included those with a family history of glaucoma; those from specific racial/ethnic groups; those with specific ocular or other medical conditions, as defined by included studies (e.g., diabetes); and older age groups, as defined by included studies.

We also included studies of suspected OAG subpopulations, which included participants identified from prior testing as possibly having glaucoma or as having a risk factor for glaucoma (e.g., high intraocular pressure), but with an unconfirmed diagnosis. We excluded studies of participants with known glaucoma at the time of screening (KQs 1, 2, 4, and 5) and those that included the healthy eye of a participant with known glaucoma (KQ3). We excluded studies in which the candidate tests were performed on a sample of healthy volunteers only. We did not exclude studies that enrolled healthy volunteers in addition to those with suspected glaucoma at the time of screening.

Interventions

We included studies of the following screening tests conducted alone or in any possible combination (including multicomponent simultaneous or sequential testing):

- Direct and indirect ophthalmoscopy
- Fundus photography or computerized imaging of the posterior pole, optic disc, or retinal nerve (optical coherence tomography (OCT; with the exception of OCT 1 and OCT 2), retinal tomography, scanning laser polarimetry)
- Pachymetry (corneal thickness measurement) when used in conjunction with another test to diagnose glaucoma; we excluded studies where pachymetry was used alone
- Perimetry (including short-wavelength, high-pass, motion, flicker perimetry, yellow and blue perimetry)
- Tonometry (contact and noncontact tonometry)

We excluded studies of the following screening tests and related analysis software that are either (1) not commercially available for screening or (2) not commonly used or no longer used in the diagnosis of glaucoma:

- Contrast sensitivity and visual acuity
- Electroretinography
- Heidelberg retina tomograph (HRT) I (confocal scanning laser ophthalmoscope)
- Optical coherence tomography (OCT) 1 and OCT 2
- Tests of color vision
- Versions of the GDx (scanning laser polarimeter) without corneal compensation
- Water drinking tests

We also excluded studies that examined only technical aspects of included devices (e.g., usability, technician training).

Screening and Diagnostic Device Descriptions

Below are detailed descriptions of the devices and tests included in this CER, with information on mechanism, operation, and skill required to complete and interpret each test.

Tests of Optic Nerve Structure

Heidelberg Retinal Tomography

The Heidelberg retina tomograph is a scanning laser ophthalmoscope that can create three-dimensional images of the retina and optic nerve head. After the images are collected, the device analyzes them to calculate values such as the area of the optic nerve head, the area and volume of the neuroretinal rim, the ratio of the area of the optic nerve head "cup" to the disc, and many others. The current versions of the device also compare values obtained for a particular patient with those of a population of healthy persons to estimate the probability of optic nerve disease consistent with glaucoma. Reports of these data can then be used by clinicians to diagnose either new or progressive disease.

The device itself consists of a table-mounted unit with imaging optics and a connected computer to allow for image acquisition and management of patient data. As such, the system is not easily portable. Operation of the device also requires personnel who have been trained to operate the software and hardware. This training includes not only the basics of entering patient information but also trouble-shooting problems with image quality and patient positioning.

Optical Coherence Tomography

An optical interferometer is used to create cross-sectional images of ocular structures, including the retina and optic nerve head. Once the images are collected, they can be analyzed and various anatomic layers can be segmented for further analysis. Such analysis of the retinal nerve fiber layer and structure of the optic nerve head is relevant to the diagnosis of glaucoma.

The original OCT devices all used time-domain analysis of the collected data. Thus, the time to collect an image was a significant limitation to the resolution that could be achieved. More recently, spectral-domain devices have become available; they can collect higher resolution images in the same time required to collect lower resolution images using the time-domain devices.

As with the HRT, the OCT machines all consist of a table-mounted unit with the optics connected to a computer for image acquisition and analysis. There are more portable versions of the optics available, but they still require a connection to computational power for image analysis. OCT devices also require trained personnel to operate them effectively.

Optic Disc Photography

After hand drawing, photographs are perhaps the earliest method of documenting the appearance of the optic nerve head. Photographs can be taken as single images, nonsimultaneous stereo pairs in which the camera is moved slightly between images, and simultaneous stereo pairs in which two images are captured at the same time. The advantage of stereo photographs is that they enhance the reviewer's ability to assess optic nerve structures. Although optic disc photographs were first captured on film, they now are captured using digital technology. Historically, obtaining good-quality photographs required a trained ophthalmic photographer and an expensive camera system. As the systems have become more computerized and the optics more refined, the skill required to acquire adequate images has declined to the point where some telemedicine systems no longer require specially trained operators.

The analysis of optic nerve photographs is currently less quantitative than analysis for the imaging techniques previously discussed. Although computerized analysis of digital images is improving, good-quality evaluation of disc photographs requires significant skill on the part of the examiner.

Retinal Nerve Fiber Layer (RNFL) Photography

RNFL photography is a specialized photographic technique using red-free (green) light to image the RNFL. Green light is absorbed by the melanin in the retinal nerve fiber, and the striations become visible as they radiate around the optic nerve. RNFL photographs permit comparisons over time and can help detect diffuse or localized RNFL loss consistent with glaucoma. RNFL photographs are difficult and often uncomfortable for the patient, and require specialized equipment and trained photographers. For these reasons and because they are difficult for clinicians to interpret, they rarely are used in clinical practice.

Scanning Laser Polarimetry (SLP)

The scanning laser polarimeter assesses the RNFL using polarized light to measure the phase shift that occurs due to the presence of repetitive microstructures. The size of the shift depends on both the thickness and integrity of the RNFL. The cornea also contains repeating structures that affect polarized light, so the commercial version of the scanning laser polarimeter has undergone multiple revisions to accommodate this effect. The images collected by SLP can be analyzed to assess the thickness of the RNFL, which is directly related to glaucomatous damage.

The company that manufactures the commercially available SLP (GDx, Carl Zeiss Meditec) has designed the device as a single table-top unit that does not require a separate computer, unlike the OCT and HRT. As with other available devices, however, training is required to obtain usable images reliably.

Tests of Optic Nerve Function

Frequency Doubling Technology (FDT)

Frequency doubling technology uses a perimeter that takes advantage of an alternative visual stimulus to assess the visual field. It presents flickering stimuli of varying contrast in various locations. The FDT perimeter was the first instrument using this technology. It is small, portable, and can be administered in a screening mode in 45 to 90 seconds. The more recent instrument using this technology is the Humphrey Matrix, which uses smaller targets and has increased the number of locations tested in the visual field. The FDT is smaller than the Humphrey Matrix, but both are relatively portable and technicians can be trained quickly to operate these instruments.

Goldmann Applanation Tonometry (GAT)

Tonometry is the measurement of intraocular pressure (IOP). Applanation tonometry indirectly assesses the IOP by measuring the pressure required to flatten a certain area of the cornea. The Goldmann applanation tonometer uses a standard probe and is the current standard method to measure IOP. The cornea must be anesthetized with an eyedrop. The instrument is mounted on a biomicroscope. Most biomicroscopes are not portable, and skilled training is needed for a technician or clinician to perform tonometry.

Noncontact Tonometry

Noncontact tonometry, also called air-puff tonometry, uses a rapid pulse of air to flatten the cornea. The IOP is estimated by an electro-optical system based on the time needed for the jet of air to flatten the cornea. It takes less time to flatten a soft eye (low IOP) than a hard eye (high IOP). The eye does not need to be anesthetized. Although the pulse is very rapid, patients frequently are startled by this test. Training to operate the instrument is easy, and the table-mounted instrument can be transported when necessary.

Standard Automated Perimetry (SAP)

A perimeter can measure the visual field of an eye in a systematic way by presenting light stimuli of varying intensity at various locations. From the point of fixation, both the width and sensitivity of the visual field can reveal defects typical of glaucoma optic nerve damage. The size and brightness of the light target are varied at multiple locations, and the subject is asked to respond if the image is seen. The resultant score is a critical tool in both the diagnosis and monitoring of the progression of glaucoma. SAP uses a white light stimulus on a white background to determine threshold values. Two instruments in wide use are the Humphrey field analyzer (HFA) and the Octopus. An alternative method of assessing the visual field is short-wavelength automated perimetry (SWAP), which uses a blue stimulus on a yellow background and is thought to be more sensitive for detecting early glaucoma. These instruments are all automated and administered by a technician after a short training time. Because it is subjective, perimetry can be fatiguing for the patient to perform. Furthermore, all devices are large enough to require a tabletop, although some are small enough to be reasonably portable.

Comparators/Reference Standards

KQs 1, 2, 4, 5, and 6 explore comparisons of the interventions mentioned above (conducted alone or in any possible combination as a part of a screening-based program) to no screening program (including usual care, case finding, and referral) and to different screening-based

programs (above tests conducted alone or in any possible combination). KQ3 explores comparisons of screening/diagnostic tests to the reference standards of confirmed OAG at the time of followup or OAG requiring treatment (diagnosed by an ophthalmologist using objective assessments). The diagnosis should have included a clinical examination with measurement of IOP, assessment of the visual field, and assessment of the optic nerve head and/or RNFL or review of disc photographs. We considered other methods to confirm diagnosis as defined by included studies whenever the examinations/tests were specified in the report. We acknowledge that there is no consensus on the gold standard test or combination of tests for the identification of patients with OAG. We adapted the reference standards for KQ3 from a diagnostic test accuracy review conducted by Burr et al. (2007).[7]

Outcomes

KQ1

Primary Outcome

We identified studies that reported the proportion of participants with moderate, severe, and profound visual impairment (as defined in the International Classification of Diseases, Clinical Modification, 9th Revision[8]). We also considered other measurements of visual impairment as defined by included studies.

Secondary Outcome

We considered visual acuity outcomes (e.g., mean visual acuity or proportion of participants in prespecified visual acuity categories) reported in the included studies and as measured with Snellen or any other valid chart that yields scores that can be converted to Snellen fractions or logarithm of the Minimum Angle of Resolution (logMAR) values.

KQ2

We identified studies that reported the participants' mean total or relevant item/subscale scores as measured by any validated questionnaire (e.g., National Eye Institute Visual Function Questionnaire) to compare the following patient-reported outcomes among the treatment groups of interest:

- Vision-related quality of life (vision-related functional decrement compared with individuals without eye or vision problems, as well as the impact of functional loss on activities of daily living)—primary outcome
- Patient satisfaction—secondary outcome

KQ3

To calculate sensitivity and specificity, we extracted the number of participants in the following categories: true positives, true negatives, false positives, and false negatives. We also included studies that reported sensitivity, specificity, or area under the receiver operating characteristic curve (AUC).

KQ4

We extracted the mean IOP to analyze the differences between/among the groups of interest.

KQ5

We compared the proportion of participants with progressive optic nerve damage, as defined by included studies and as observed via fundus photography or other imaging of the posterior pole, and the proportion of participants with progression of visual field loss as defined by included studies.

KQ6

We recorded the proportion of participants experiencing the following adverse events (adapted from the U.S. Preventive Services Task Force, www.ahrq.gov/clinic/uspstf05/glaucoma/glaucrs.htm) for each group of interest:

- Corneal abrasions
- Distortion of sense of taste (due to anesthetic use)
- Examination apprehension
- Eye irritation
- Harms related to overdiagnosis
- Infection
- Psychological effects related to a glaucoma diagnosis or misdiagnosis

We also planned to report other harms as reported in included studies. We note that different screening and followup methods may result in different harms.

Timing of Outcome

We assessed outcomes for KQs 1, 2, 4, and 5 at 1 year of followup and at annual intervals thereafter. There was no minimum length of followup for outcomes related to KQs 3 and 6.

Setting

Settings for this review included community screenings, non-eye-care health provider settings, eye-care provider clinical settings (ophthalmologists and optometrists), and telemedicine.

Search Strategy

We searched the following databases for primary studies: MEDLINE®, Embase, LILACS (Latin American and Caribbean Literature on Health Sciences), and CENTRAL (the Cochrane Central Register of Controlled Trials). We developed a search strategy for MEDLINE, accessed via PubMed, based on an analysis of the medical subject heading (MeSH) terms and text words of key articles identified a priori. We adapted this search strategy for searches of Embase (using EMTREE terms), CENTRAL, and LILACS. We searched the literature without imposed language, sample size, or date restrictions. We searched relevant systematic reviews to identify any additional studies that should be included. We searched from the beginning of each database through October 6, 2011.

We also conducted a search in MEDLINE and CENTRAL for systematic reviews that addressed the KQs of interest. The search included the topic strategy (noted in Appendix A of the full report) combined with the term "AND systematic[sb]" and was limited to systematic reviews published from 2009 to 2011. We searched MEDION (www.mediondatabase.nl) for related diagnostic accuracy reviews (KQ3). The search for systematic reviews was conducted on March 2, 2011.

We screened an existing database of eye and vision systematic reviews prepared by Li (2010) to identify relevant OAG systematic reviews published prior to 2009.[9] Li searched MEDLINE, Embase, and CENTRAL from inception to September 2009, and two reviewers screened titles, abstracts, and full-text manuscripts to identify eye and vision systematic reviews.

Abstract Screening

We developed an abstract screening form. All investigators pilot tested the form using a set of candidate abstracts identified from the electronic searches. We screened potentially relevant citations (primary studies and systematic reviews) via the Web-based systematic review software DistillerSR (http://systematic-review.net/). All citations identified by the search strategies were uploaded to DistillerSR. Two reviewers independently assessed titles and abstracts resulting from the literature searches according to the inclusion criteria. We classified the titles and abstracts as "include," "exclude," or "unsure." We resolved disagreements about eligibility through discussion among reviewers. We initially reviewed for inclusion non-English-language articles with English abstracts but decided to exclude all non-English articles, as we were unable to identify appropriate translation services for all non-English abstracts and/or the full text of potentially eligible articles prior to the start of full-text screening.

Full-Text Screening

Two reviewers independently applied the same inclusion criteria used during abstract screening. Citations tagged as "unsure" by both reviewers, "unsure" by one reviewer and "include" by the other, or "include" by both reviewers were promoted to full-text screening. We excluded non-English-language articles from further consideration at this stage. We resolved any disagreements regarding inclusion through discussion between reviewers, or, as needed, among all investigators during a team meeting.

Data Abstraction

Data abstraction forms were designed and pilot tested. One reviewer extracted descriptions of the study, including details about the population, devices/tests, and outcomes of interest, using the systematic review software DistillerSR. A second reviewer verified the data. We resolved disagreements through discussion.

Risk-of-Bias Assessment

We used the Cochrane Collaboration's tool for assessing the risk of bias of randomized and quasi-randomized trials. Two reviewers assessed the included studies for sources of systematic bias according to the guidelines in Chapter 8 of the Cochrane Handbook for Systematic Reviews of Interventions and evaluated the studies for the following criteria: sequence generation and allocation concealment (selection bias); masking of participants, study investigators, and outcome assessors (detection bias); incomplete outcome data (attrition bias); selective outcome reporting (reporting bias); and other sources of bias.[10] Masking of investigators and participants may not have been possible with some of the tests being examined but was noted when mentioned. We reported judgments for each criterion as "low risk of bias," "high risk of bias," or "unclear risk of bias (information is insufficient to assess)." The two reviewers resolved disagreements through discussion.

Two reviewers assessed the methodological rigor of observational studies using a modified version of the Newcastle Ottawa Scale.[11] The Newcastle Ottawa Scale includes domains to assess the quality of study group selection (representativeness, selection, case definitions); comparability of cohorts/cases and controls on the basis of the design or analysis; and ascertainment of exposure(s) or outcome(s), adequacy of followup, nonresponse rate, and financial or other conflicts of interest. Each item query required a "yes," "no," or "unable to determine/not reported" response.

For KQ3, we used the Quality Assessment of Diagnostic Accuracy Studies (QUADAS) checklist, which is a specific risk-of-bias assessment for diagnostic accuracy studies.[12] The QUADAS tool includes 14 items that evaluate numerous domains, including representativeness, inclusion/exclusion criteria, choice of reference standard, masked interpretation of results of tests and reference standard, and study withdrawal. We reported judgments for each checklist item as "yes," "no," or "unclear."

We used a tool adapted by Li (2010) from the Critical Appraisal Skills Program, Assessment of Multiple Systematic Reviews, and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement to assess the methodological quality of systematic reviews.[9] We used the following criteria, adapted from Li, to determine which were of sufficient quality to be considered for inclusion in this review: comprehensive search for primary studies (searches of more than one bibliographic database), inclusion of a risk-of-bias assessment of primary studies, and conduct of appropriate analytic methods for meta-analyses (no pooled-arm analysis).

Rating of Evidence

We assessed the quantity, quality, and consistency of the body of available evidence addressing KQ1 through KQ6. We used an evidence grading scheme recommended by the Grading of Recommendation Assessment, Development and Evaluation (GRADE) Working Group, adapted by AHRQ in the Methods Guide for Effectiveness and Comparative Effectiveness Reviews (www.effectivehealthcare.ahrq.gov/index.cfm/search-for-guides-reviews-and-reports/?pageaction=displayproduct&productid=328) and recently published in the Journal of Clinical Epidemiology.[13,14]

We considered the strength of the study designs, with randomized controlled trials as the highest level of evidence, followed by comparative observational studies. Whenever an outcome was evaluated by at least one RCT, and possibly observational studies as well, we graded the RCT and also the quality of the observational studies. If an outcome was evaluated by only one or by no RCT, our evidence grade was based on the single RCT (if any) and the best available observational study.

We assessed the quality and consistency of the best available evidence, including assessments of the risk of bias in relevant studies, as well as aspects of consistency, directness, and precision, as described in the Methods Guide for Effectiveness and Comparative Effectiveness Reviews and by Owens et al. (2010).[14] For each outcome of interest, two reviewers graded the major outcomes for each KQ, and then the entire team discussed their recommendations and reached consensus.

Data Synthesis

When we identified existing high-quality systematic reviews that addressed the KQs, we cited these reviews as evidence and did not abstract and synthesize data from the primary studies. For interventions (screening and diagnostic tests), comparisons, and outcomes that were not

covered in systematic reviews, and to update systematic reviews, we abstracted evidence from primary studies, including those that had been published or identified after the date of the last search conducted for the systematic review. We followed the recommendations of Whitlock et al. (2008) for incorporating systematic reviews in complex reviews and provided a narrative summary of the review methods (i.e., inclusion/exclusion criteria, search strategy, statistical methodology) and findings (i.e., number of studies included, quantitative and qualitative results). Similarly, in the instance of multiple reviews, we evaluated the consistency across reviews addressing the same KQ.[15]

Results

The electronic search of MEDLINE and CENTRAL identified 64 systematic review titles and abstracts. The Li 2010 database included 105 additional systematic review titles and abstracts. We excluded 167 of the 169 systematic review titles and abstracts for the following reasons: did not address any of the KQs, narrative summary only, could not retrieve full text to assess, similar inclusion criteria but date of search for studies older than another included systematic review on the same topic, and duplicate reference to an included systematic review. We identified two systematic reviews for inclusion.[7,16] One systematic review (Burr et al., 2007)[7] addressed the diagnostic test accuracy of candidate screening tests for the detection of OAG (KQ3), and the second review (Hatt et al., 2006)[16] addressed the question of whether screening-based programs prevent optic nerve damage due to OAG when compared with no screening (KQ5).

The electronic searches conducted for concurrent CERs of screening and treatment for OAG identified a total of 4,960 primary study titles and abstracts. After removing duplicate citations, conference abstracts, and book chapters (n = 1,083), we reviewed 3,877 titles and abstracts. We retrieved the full text of 652 articles and assessed the studies for inclusion in this review. We included 83 primary studies that addressed the diagnostic accuracy of candidate screening tests for the detection of OAG that were not included in the Burr et al., 2007, systematic review (KQ3) because the investigators examined newer technologies or the manuscript was published after December 6, 2005. We did not identify any primary studies eligible for inclusion for any other KQ.

Because there was appreciable variability in devices, parameters, thresholds, and measurement of outcomes reported in the primary studies of interest, we did not combine the results using meta-analysis and instead present a narrative summary, with particular emphasis on studies that identified early disease and/or examined newer and more frequently reported technologies. As we are unable to determine which parameters are most important for identifying persons with OAG and as our reported results would have been limited to a few parameters in a subset of studies, we chose to discuss, as appropriate, the full complement of device parameters and thresholds as reported in the included studies. We summarize, where possible, the magnitude of validity across all parameters of interest for devices considered in this report.

Of the devices that were included in the Burr et al. (2007) review, the following were also identified from the search of the literature conducted for this report: HRT II, optic disc photography, RNFL photography, FDT, HFA, GAT, and noncontact tonometry. As there are differences in the eligibility criteria for the current report and the Burr et al. review, including the devices, outcomes, and comparisons of interest, we chose not to undertake an update of the quantitative estimates of sensitivity and specificity from the Burr et al. review for the devices that were common to both reviews.

KQ1

We did not identify any study that addressed whether participation in an OAG screening-based program leads to less visual impairment when compared with no screening or another screening-based program.

KQ2

We did not identify any study that addressed whether participation in an OAG screening-based program leads to improvements in patient-reported outcomes when compared with no screening or another screening-based program.

KQ3

Evidence From Systematic Reviews

Burr et al. (2007) conducted a diagnostic test accuracy review of candidate diagnostic and screening tests for OAG.[7] In summary, the investigators included 40 studies totaling more than 48,000 participants 40 years of age and older and those at high risk for the development of OAG based on demographic characteristics or comorbidities. The focus was on studies of participants likely to be encountered in a routine screening setting. Tests of optic nerve structure, optic nerve function, and IOP were included and compared with other individual or combination tests. The primary reference standard was confirmation of OAG at followup examination. Also considered was diagnosis of OAG requiring treatment. Prespecified outcomes were measures related to sensitivity, specificity, harms, acceptability, and reliability. There was significant statistical heterogeneity among the included studies for the majority of the tests, with the exception of optic disc photography (sensitivity), HRT II (sensitivity and specificity), and FDT C-20-1 (sensitivity). The authors also note that no studies were at low risk of bias for all of the modified QUADAS domains examined. A small subset of eight studies was judged to have higher quality, as the study investigators enrolled participants who were representative of a screening/diagnostic setting (low risk of spectrum bias). As well, these studies were at low risk of verification bias (both partial and differential), test bias, and diagnostic review bias.

Detailed Analysis of Primary Studies

We undertook a search for additional primary studies, as described in the Methods section, to address the diagnostic accuracy of candidate screening tests, and identified 83 studies.

With respect to the risk of bias of included primary studies, 68 percent of the included studies were at high risk of spectrum bias, as the study investigators enrolled participants who were not representative of those who would receive the test in practice (i.e., healthy volunteers compared with participants with known glaucoma). Six percent of the studies were at high risk of differential verification bias because the study investigators applied a different reference standard to a subset of participants enrolled in the study. A low percentage (2 percent) were at high risk of incorporation bias, but due to the lack of detail in the descriptions of the reference standard, it was unclear whether the reference standard and candidate tests were independent of each other in 12 percent of the included studies.

With respect to masking of study personnel interpreting the results of the reference standard and candidate tests, the candidate test(s) were interpreted without knowledge of the reference standard result in 29 percent of the included studies, and the reference test interpreted without

knowledge of the candidate test(s) in 44 percent of included studies, but we judged these domains to be unclear in 54 percent and 48 percent of the included studies, respectively. Forty-eight percent of the studies did not include an explanation of withdrawals from the study, and 46 percent of the studies reported the number of uninterpretable test results.

Tests of Optic Nerve Structure

Heidelberg Retina Tomograph II

Evidence From Burr et al., 2007

HRT II was a diagnostic test of interest in three studies. Using the common criterion of one or more results that are borderline or outside normal limits, the pooled sensitivity was 86 percent (95% credible interval [CrI], 55 to 97) and the pooled specificity was 89 percent (95% CrI, 66 to 98).

Evidence From Primary Studies

Seventeen primary studies included measures of diagnostic accuracy for HRT II.[17-33] Naithani et al. (2007)[25] and Uysal et al. (2007)[27] specifically focused on detecting early or moderate glaucoma.

Naithani et al. (2007) enrolled 60 participants with glaucoma (30 with early defects and 30 with moderate visual field defects) and 60 healthy volunteers.[25] AUC values were reported to be in the range of 0.474 (disc area ratio parameter) to 0.852 (vertical cup-to-disc ratio parameter).

Uysal et al. (2007) enrolled 70 participants with early or moderate glaucoma and 70 healthy volunteers.[27] The range of sensitivity across 12 parameters was from 47.1 percent (RNFL cross-sectional area) to 74.3 percent (linear cup/disc area ratio), and the range of specificity was from 47.1 percent (mean RNFL thickness) to 71.4 percent (cup shape measure).

The remaining 15 studies explored comparisons of HRT II with other devices, such as the GDx with VCC (variable corneal compensation), OCT, HRT III, and FDT. Overall, HRT II was found not to perform as well as GDx VCC, OCT, or FDT. HRT II and HRT III were found to have a similar diagnostic profile. Three of the included studies concluded that HRT II was not an appropriate tool for population-based glaucoma screening studies.

Heidelberg Retina Tomograph III

Evidence From Primary Studies

Eleven studies examined the diagnostic accuracy of HRT III. [23,24,28,34-41] Reddy et al. (2009) identified 81 participants with early visual field loss (out of 247 participants with glaucoma) and 142 healthy volunteers. Early visual field loss was defined as a mean deviation less than 5dB.[36] The sensitivity of the Glaucoma Probability Score for distinguishing eyes with early field loss from healthy eyes was 67.9 percent, and that of the Moorfields Regression Analysis was 71.9 (at a fixed specificity of 92 percent). The investigators concluded: "Moorfields Regression Analysis and Glaucoma Probability Score have similar ability to detect glaucomatous changes, and typically agree. The relative ease and sensitivity of the operator-independent Glaucoma Probability Score function of the HRT III may facilitate glaucoma screening."

Badala et al. (2007) compared four imaging methods for their ability to distinguish early glaucoma from healthy eyes.[40] Forty-six eyes from 46 participants with early OAG and 46 eyes from healthy volunteers were enrolled. Sensitivity (parameter: reference height) ranged from 4 to

70 percent (Frederick S. Mikelberg discriminant function and Reinhard O. W. Burk discriminant function) when holding the specificity of the test constant at 95 percent.

Ophthalmoscopy

Evidence From Burr et al., 2007

Burr et al. (2007) included seven studies addressing the diagnostic accuracy of ophthalmoscopy. Using a common cutoff point of a vertical cup-to-disc ratio greater than or equal to 0.7, pooled sensitivity for the five studies with this common criterion was 60 percent (95% CrI, 34 to 82 percent), and specificity was 94 percent (95% CrI, 76 to 99). The diagnostic odds ratio (DOR) was 25.7 (95% CrI, 5.79 to 109.50), suggesting a 26-fold higher odds of a positive test among those with glaucoma than those without glaucoma.

Optical Coherence Tomography (OCT)

Evidence From Primary Studies

Of the 47 included studies that investigated the diagnostic accuracy of OCT, [18,25,26,29-32,34,40,42,43-79] 34 considered the Stratus OCT, 10 included the Cirrus OCT, 6 considered the RTVue OCT, 2 included the Spectralis OCT, 2 examined the OTI OCT, and 1 included the OTI Spectral OCT/SLO. Across the 34 studies that examined the Stratus OCT, all were at high risk of spectrum bias because those with known disease as well as those with healthy eyes were enrolled in the studies. The sample size ranged from 26 to 95 participants with glaucoma or suspected glaucoma and 37 to 128 healthy volunteers, with one study also enrolling 130 participants with ocular hypertension. For the parameter average RNFL thickness, the range of sensitivity was 24 to 96 percent, suggesting appreciable heterogeneity among the studies. The range of specificity was 66 to 100 percent.

Optic Disc Photography

Evidence From Burr et al., 2007

There were six studies of optic disc photography. The range of sensitivity was from 65 to 77 percent, and the range of specificity was from 59 to 98 percent.

Evidence From Primary Studies

We included two studies of the diagnostic accuracy of optic disc photography[33,80] and one study of cup-to-disc ratio measurement as measured by an ophthalmologist using a slit-lamp biomicroscope and 78 Diopter lens.[81] Danesh-Meyer et al. (2006) included participants with OAG as well as glaucoma suspects and healthy volunteers.[33] The AUC (comparison of those deemed to have glaucoma and borderline disease vs. normal) was 0.84 (95% confidence interval [CI], 0.74 to 0.92) for the cup-to-disc ratio and 0.95 (95% CI, 0.80 to 0.98) for the Disc Damage Likelihood Score, suggesting that the Disc Damage Likelihood Score is a more effective means of discriminating people with and without disease. The diagnostic accuracy of cup-to-disc ratio measurement from the Francis et al. (2011) study[81] is described in the section on FDT C-20 perimetry.

RNFL Photography

Evidence From Burr et al., 2007

The common cutoff point for the four included studies was diffuse and/or localized defect observed on RNFL photographs. The pooled diagnostic odds ratio was 23.1 (95% CrI, 4.41 to 123.50), and the pooled sensitivity and specificity were 75 and 88 percent, respectively.

Evidence From Primary Studies

Two studies examined the accuracy of RNFL photography.[60,82] Hong et al. (2007) analyzed RNFL photographs of 72 glaucoma and 48 healthy participants.[83] Results showed the RNFL defect score II, with an AUC of 0.75 ($p < 0.001$), was the best parameter for discriminating early glaucoma from healthy eyes (sensitivity, 58.3 percent; specificity, 95.8 percent).

Medeiros et al. (2004) compared RNFL photography with the GDx with VCC in 42 participants with OAG, 32 persons suspected of having OAG, and 40 healthy volunteers.[82] The sensitivities of the global RNFL score were 36 and 81 percent, respectively, for fixed specificities of 95 and 80 percent. At a fixed specificity of 95 percent, the sensitivity of the Nerve Fiber Indicator was 71 percent versus the 36 percent reported above for red-free photos. Overall, the global RNFL score determined from red-free photos did not perform as well as scanning laser polarimetry. The AUC was 0.91 for the GDx with VCC Nerve Fiber Indicator versus 0.84 for the global RNFL score.

Scanning Laser Polarimetry (GDx)

Evidence From Primary Studies

Twenty-seven studies included an investigation of the GDx with VCC.[18,20,22,26,29-32,40,45,58,59,61,64,71,77,78,80,82-90] The aim of eight studies was to discriminate early glaucoma from no disease.[18,20,40,45,83,85,88] In the studies that focused on early OAG, the range of sensitivity across all comparisons and cutoffs for the most frequently reported parameter—Temporal, Superior, Nasal, Inferior, Temporal average—was 29.8 to 81.63 percent. Specificity was fixed at 80, 90, or 95 percent in three studies, and the lowest reported specificity was 66.36 percent. The range in sensitivity for the nerve fiber indicator parameter across all comparisons and cutoffs was from 28.3 to 93.3 percent. The lowest specificity reported was 52.9 percent or was fixed at 80, 90, or 95 percent.

Three studies examined the GDx with enhanced corneal compensation (ECC).[59,86,87] The sample sizes of the included studies ranged from 63 to 92 glaucoma participants and 41 to 95 healthy volunteers. Medeiros et al. (2007) compared the AUCs for GDx with VCC and GDx with ECC, and reported that GDx with ECC performed significantly better than GDx with VCC for the parameters Temporal, Superior, Nasal, Inferior, Temporal average, Superior average, and Inferior average ($p = <0.01$).[86] Sehi et al. (2007)[59] and Mai et al. (2007)[87] concurred with Medeiros et al. (2007) that imaging with ECC appears to improve the ability to diagnose OAG.

Tests of Optic Nerve Function

FDT (C-20-1) Perimetry

Evidence From Burr et al., 2007

The pooled sensitivity and specificity results for the three studies that included FDT (C-20-1) perimetry and the common diagnostic criterion of one abnormal test point were high (92 and 94 percent, respectively).

Evidence From Primary Studies

Four studies discussed the accuracy of FDT C-20 perimetry.[18,81,91,92] Pueyo et al. (2009) enrolled 130 participants with ocular hypertension and 48 healthy volunteers.[18] Using a cutoff of a cluster of at least four points with a sensitivity outside 95 percent normal limits, or three points outside 98 percent normal limits, or at least one point outside 99 percent normal limits, investigators determined the sensitivity of FDT to be 31.25 percent and its specificity 72.9 percent among the subset of 32 participants with glaucomatous optic neuropathy (of the 130 with ocular hypertension). The investigators concluded that FDT might not be an ideal test for participants with early defects.

Salim et al. (2009) enrolled 35 participants with known OAG and 35 age- and sex-matched controls with no evidence of glaucoma. Investigators used FDT, noncontact tonometry, and a questionnaire individually and in all possible combinations to determine the accuracy of single and combination tests.[91] FDT's sensitivity was 58.1 percent and its specificity was 98.6 percent. Overall, FDT was determined to be the best among the candidate single and combination tests in the study, despite fair sensitivity for detecting OAG.

Pierre-Filho et al. (2006) enrolled glaucoma patients who had never experienced perimetry prior to the study.[92] The investigators reported that 21 (32.8 percent) of the 64 participants with glaucoma were identified as having early disease, but data were not provided for this subgroup. Sensitivity and specificity were 85.9 and 73.6 percent, respectively, for the presence of at least one abnormal location and 82.8 and 83 percent, respectively, for two or more abnormal locations, regardless of severity.

Francis et al. (2011) conducted population-based screening of 6,082 Latinos age 40 years and older as part of the Los Angeles Latino Eye Study (LALES) to determine the diagnostic accuracy of candidate screening tests performed alone or in combination.[81] Participants completed Humphrey Visual Field testing in addition to FDT C-20-1, GAT, and central corneal thickness and cup-to-disc ratio measurements. Diagnostic test accuracy outcomes were assessed for the general population as well as high-risk subgroups, defined as persons who were 65 years and older, those with a family history of glaucoma, and persons with diabetes. Of the 6,082 participants screened, 4.7 percent (286) were diagnosed as having OAG. Based on three glaucoma diagnosis definitions (glaucomatous optic nerve appearance, glaucomatous visual field loss, glaucomatous optic nerve and visual field loss), the test parameters vertical cup-to-disc ratio ≥ 0.8 and Humphrey Visual Field (HVF) false negatives ≥ 33 percent had the highest specificity, regardless of the definition of glaucoma (98 percent). HVF mean deviation < 5 percent had the highest sensitivity (78 percent) using the definition of optic nerve defects only, while the HVF glaucoma hemifield test had the highest sensitivity under the other two definitions (90 percent for glaucomatous visual field loss and 90 percent for both field loss and optic nerve damage). Specific results for the FDT C-20-1 were as follows (sensitivity/specificity, definition of glaucoma): 59 percent/79 percent, glaucomatous optic nerve appearance only; 68 percent/80

percent, glaucomatous visual field loss only; 67 percent/79 percent, both glaucomatous optic nerve appearance and visual field loss. The investigators reported similar results when high-risk subgroups were analyzed and concluded that "these results suggest that screening of high-risk groups based on these criteria may not improve over screening of the general population over age 40."[81]

FDT (C-20-5) Perimetry

Evidence From Burr et al., 2007

Five studies of FDT (C-20-5) with significant heterogeneity using the common cutoff point of one abnormal test point were included. The range of sensitivity was 7 to 100 percent; the specificity range was 55 to 89 percent.

FDT 24-2 Perimetry

Evidence From Primary Studies

Five studies examined the diagnostic accuracy of FDT 24-2 threshold tests using the Humphrey Matrix Perimeter.[64,93-96] All studies included participants with known glaucoma and healthy volunteers, and we judged these studies to be at high risk of spectrum bias. The range of sample size was 25 to 174 glaucomatous eyes and 15 to 164 healthy eyes. Sensitivities and specificities were reported for the parameters mean deviation, pattern standard deviation, and glaucoma hemifield test outside of normal limits. There was appreciable heterogeneity in the estimates of sensitivity at 80 percent, 90 percent, and 95 percent specificity that may be attributed to a number of factors, including different patient populations and variations in cutoff points. The sensitivity was 55 percent for the mean deviation and 94 percent at 80 percent fixed specificity.[94,95] Tafreshi et al. (2009) and Leeprechanon et al. (2007) reported 39 and 87 percent at 90 percent fixed specificity, and 32 and 82 percent at fixed 95 percent specificity, respectively.[93,95] Sensitivity and specificity for pattern standard of deviation (PSD) and glaucoma hemifield test are reported with their cutoff points in the evidence tables in Appendix C of the full report.

Bagga et al. (2006)[64] and Burgansky-Eliash et al. (2007)[96] reported the AUC for the mean deviation parameter (0.69 for both studies with $p < 0.04$ and 95% CI, 0.564 to 0.815, respectively). The AUCs for PSD were 0.66 ($p = 0.09$)[64] and 0.733 (95% CI, 0.618 to 0.848).[96]

FDT 30-2 Perimetry

Evidence From Primary Studies

Two studies discussed the detection of early glaucoma using the FDT 30-2 threshold test with the Humphrey Matrix Perimeter.[60,83] Both Hong, Chung, Hong, et al. (2007)[60] and Hong, Ahn, Ha, et al. (2007)[83] enrolled OAG participants with early visual field loss and healthy controls. The mean deviation and PSD were judged to be good parameters for distinguishing between eyes with early disease and eyes with no known defects. The mean deviations were 0.795 and 0.750 and the PSDs were 0.808 and 0.934 for Hong, Chung, Hong, et al. and Hong, Ahn, Ha, et al., respectively. Both study groups, however, determined that the best parameter for distinguishing eyes with early glaucoma from healthy eyes was the number of points that have p less than 5 percent in the pattern deviation plot, with an AUC of 0.985 (95% CI, 0.943 to 0.998) in Hong, Chung, Hong, et al. and 0.990 ($p < 0.001$) in Hong, Ahn, Ha, et al.

FDT N-30 Perimetry

Evidence From Primary Studies

Four studies examined the accuracy of the FDT N-30 threshold test.[20,94,97,98] Zeppieri et al. (2010) focused on the detection of early glaucoma among a sample of 75 participants with OAG, 87 with ocular hypertension, 67 with glaucomatous optic neuropathy, and 90 healthy volunteers.[20] At the best cutoff of less than -0.78, the sensitivity of the mean deviation parameter was 61.3 percent and the specificity was 73.7 percent for distinguishing early OAG from healthy eyes. At the best cutoff of greater than 3.89, the sensitivity of the PSD was 76.0 percent and the specificity was 87.8 percent. Salvetat et al. (2010) focused on the detection of early disease among a sample of 52 participants with early OAG and 53 healthy volunteers.[98] The sensitivity of mean deviation for distinguishing early OAG from healthy eyes at the best cutoff (less than -1.12) was 67 percent and the specificity was 74 percent. At the best cutoff of greater than 3.97, the sensitivity of the parameter PSD was 96 percent and the specificity was 85 percent.

Goldmann Applanation Tonometry

Evidence From Burr et al., 2007

At the common cutoff point of IOP greater than 20.5-22 mm Hg, nine studies with significant heterogeneity reported sensitivity in the range of 10 to 90 percent and specificity in the range of 81 to 99 percent.

Evidence From Primary Studies

Two studies[64,81] included examination of GAT. Bagga et al. (2006) compared the ability of various tests of structure and function to discriminate healthy eyes (n = 22) from eyes with known glaucomatous optic neuropathy (n = 25).[64] The AUC for IOP, as measured by GAT, was 0.66 (p = 0.05).

The methods of the Francis et al. (2011) study (LALES)[81] are discussed in the FDT C-20 section of the full report. The specific sensitivity and specificity values for GAT using a cutoff of ≥ 21 mm Hg for the three definitions of glaucoma were as follows (sensitivity/specificity, definition of glaucoma): 21 percent/97 percent, glaucomatous optic nerve appearance only; 23 percent/97 percent, glaucomatous visual field loss only; 24 percent/97 percent, both glaucomatous optic nerve appearance and visual field loss.

Humphrey Visual Field Analyzer

Evidence From Primary Studies

Ten studies examined the diagnostic accuracy of the HFA. Of these, six examined HFA Short Wavelength Automated Perimetry;[18,44,64,93,97,99] two tested HFA-SAP, (SAP)-SITA, and HFA SAP-Full Threshold (FT);[93,97] four examined HFA-SITA-Standard;[33,90,92,96] and one tested the HFA SITA-Fast protocol.[92] The HFA Short Wavelength Automated Perimetry testing protocol (the most frequently reported) included 25 to 286 participants with glaucoma and 22 to 289 healthy volunteers across the six included studies. Sensitivity across all comparisons and cutoffs for the mean deviation ranged from 25.9 to 83 percent. Specificity ranged from 80 to 95.2 percent. Cutoff points ranged from -5.42 to -11.06 dB.

Noncontact Tonometry

Evidence From Burr et al., 2007

One study reported a sensitivity of 92 percent and specificity of 92 percent using the criterion of IOP greater than 21 mm Hg.

Evidence From Primary Studies

Salim et al. (2009) included noncontact tonometry, individually and in all possible combinations, with other measures of structure and function to determine the accuracy of single and combination tests.[91] IOP, as measured by noncontact tonometry, was found not to be a very sensitive test for detecting glaucoma (sensitivity 22.1 percent). The investigators acknowledge that use of topical medications by the glaucoma participants could limit the ability to identify those with disease.

Oculokinetic Perimetry

Evidence From Burr et al., 2007

Four studies were included that examined the diagnostic accuracy of oculokinetic perimetry. The common criterion varied in description, but is best described as one or more points missing. The odds of a positive test were 57 times as high (DOR, 57.54) for those with glaucoma as for those without glaucoma (95% CrI, 4.42 to 1585.00). The pooled sensitivity and specificity were 86 and 90 percent, respectively.

SAP Suprathreshold Test

Evidence From Burr et al., 2007

Nine studies, including the Baltimore Eye Survey and the Blue Mountains Eye Study, examined the SAP suprathreshold test. Although the sensitivity and specificity were similar for the Baltimore and Blue Mountains studies, there was significant heterogeneity among the included studies. The range in sensitivity was 25 to 90 percent; the range in specificity was 67 to 96 percent.

SAP Threshold Test

Evidence From Burr et al., 2007

Among the five studies analyzed for SAP threshold, both Humphrey 30-2 and 24-2 threshold and Octopus 500 were evaluated. The pooled sensitivity was 88 percent, and specificity was 80 percent for the common cutoff point. (The definition of the common cutoff point differed by included study, but is defined in Burr et al.)

Tendency-Oriented Perimetry

Evidence From Primary Studies

Pierre-Filho et al. (2006) compared frequency doubling technology), tendency-oriented perimetry using the Octopus 301 G1-TOP program, SITA Standard, and SITA Fast in 117 eyes (64 with glaucoma and 53 healthy eyes).[92] The Octopus 301 perimeter test was considered abnormal under two conditions: when the mean defect was "> 2dB and/or the loss variance

> 6 dB (TOP 1), and…there were at least seven points (three of them contiguous) with a reduction in sensitivity ≥ 5 dB in the corrected comparisons graphic (TOP 2)."[92] The sensitivity using definition TOP 1 was 87.5 percent (95% CI, 76.3 to 94.1) and the specificity was 56.6 percent (95% CI, 42.4 to 69.9). With definition TOP 2, the sensitivity was 89.1 percent (95% CI, 78.2 to 95.1) and the specificity was 62.3 percent (95% CI, 47.9 to 74.9).

Direct Comparisons of Candidate Tests

Evidence From Burr et al., 2007

Six studies included comparisons of SAP with optic disc photography, HRT II, FDT, and/or GAT. Burr et al. concluded that sensitivity results at the common cutoff point for each test revealed that SAP performed better than GAT. One of the two studies that addressed the comparison of SAP to GAT reported estimates of sensitivity of 89 percent and 3 to 14 percent, respectively. Specificity values were 73 percent for SAP and 98 to 99 percent for GAT. Burr et al. also concluded that SAP was similar to HRT II. The sensitivity of SAP was 72 percent and the sensitivity of HRT II was 69 percent in one of the two included studies; the specificity for both tests was 95 percent. There was one included study in which the investigators compared SAP with optic disc photography. Optic disc photographs had a similar sensitivity (73 to 77 percent) and specificity (59 to 62 percent) to SAP (sensitivity, 50 to 71 percent; specificity, 58 to 83 percent). In the two studies that included comparisons of SAP with FDT, one study reported similar sensitivity estimates (SAP, 63 to 90 percent; FDT C-20-5, 68 to 84 percent) and similar specificity values (SAP, 58 to 74 percent; FDT C-20-5, 55 to 76 percent).

Based on analyses of the common criterion for each test, test accuracy, combination tests, tests for glaucoma at specific stages, and direct and indirect comparisons of tests, Burr et al. (2007) concluded that optic disc photography, HRT II, FDT, SAP, and GAT were candidates for use in a screening-based program.

Conclusion

Based on the Burr et al. (2007) findings,[7] standard automated perimetry was compared with other tests available at that time. SAP had higher sensitivity than Goldmann tonometry, similar sensitivity to HRT, and lower sensitivity than disc photos or FDT. In terms of specificity, SAP performed better than disc photos and FDT, similar to HRT, and worse than Goldmann tonometry.

We identified several additional studies assessing the performance of glaucoma screening tests not included in the Burr et al. review. The studies included newer imaging (GDx, HRT III, OCT) and functional (Short Wavelength Automated Perimetry, new FDT patterns) technologies. However, despite improvements in the technology, it is still not clear that there is any one test or combination of tests suitable for use in glaucoma screening in the general population. Significant barriers to identifying and characterizing potential glaucoma screening tests remain. These barriers include the lack of a definitive diagnostic reference standard for glaucoma and heterogeneity in the design and conduct of the studies. Because of these barriers, the ranges of sensitivities, specificities, and AUCs are large and prevent a coherent synthesis.

KQ4

We did not identify any study that addressed whether participation in an OAG screening-based program leads to reductions in IOP when compared with no screening or another screening-based program.

KQ5

Evidence From Systematic Reviews

Hatt et al. (2006) undertook a systematic review of randomized trials of screening modalities for OAG compared with no screening (including opportunistic case finding and referral). There were no restrictions on included populations.[16] The primary outcome of interest was the prevalence of visual field loss, defined as the proportion of participants with a prespecified severity of visual field loss diagnosed by either manual or automated field assessment. Other primary outcomes included the prevalence of optic nerve damage and visual impairment. Electronic searches of five databases, including MEDLINE and CENTRAL, were conducted in 2006 and again in January 2009, but none of the studies that were identified were eligible for inclusion. The review authors acknowledged that RCTs require lengthy followup and are predicated on identifying appropriate candidate tests that may be incorporated into a screening-based program.

Detailed Analysis of Primary Studies

We did not identify any study that addressed whether participation in an OAG screening-based program leads to reductions in visual field loss or optic nerve damage when compared with no screening or another screening-based program.

KQ6

We did not identify any study addressing the harms associated with screening for OAG.

Discussion

The purpose of this Comparative Effectiveness Review was to summarize the evidence linking screening for glaucoma to intermediate and functional health outcomes of treatment. We did not identify evidence to address five of the six KQs of interest, as there were no population-based studies that screened and followed treated or untreated asymptomatic persons with disease and also included a suitable comparison group of early glaucoma patients identified via case finding, referral, or a different screening-based program (Figure A).

The investigators of the evidence report Primary Care Screening for Ocular Hypertension and Primary Open-Angle Glaucoma: Evidence Synthesis, commissioned by the Agency for Healthcare Research and Quality in 2005, found no evidence assessing screening and subsequent treatment of glaucoma in a population setting and concluded that while there was good evidence to suggest that treating early primary open-angle glaucoma is beneficial, based on the lack of evidence regarding screening, more research is needed to address whether screening is "effective in improving vision-specific functional outcomes and health-related quality of life."[6] As our updated search of the literature was unable to identify any evidence linking screening to the prespecified intermediate and functional outcomes, we also conclude that more research is needed to address this question. A randomized controlled trial of glaucoma screening would be

the optimal study design, as an RCT design would allow investigators to enroll participants with similar risk profiles and minimize the risk of lead-time bias. The feasibility of an RCT would be contingent, however, on both the identification of sufficiently sensitive and specific tests for screening and diagnosing persons with glaucoma and the establishment of a standard definition for OAG.

A sixth KQ (KQ3) addressed the accuracy of candidate screening/diagnostic tests for glaucoma. After completing a systematic review of 40 included studies and 48,000 participants, Burr et al. (2007)[7] concluded that optic disc photography, HRT II, FDT, SAP, and GAT were potential candidates for a screening-based program, but acknowledged that given the "imprecision in estimates from the pooled meta-analysis models for the diagnostic performance of each test it was not possible to identify a single test (or even a group of tests) as the most accurate."[7]

Building on the comprehensive evaluation by Burr et al. (2007), we identified 83 additional studies evaluating the diagnostic accuracy of candidate tests published as of October 6, 2011. While there is now more evidence regarding Optical Coherence Tomography, the Heidelberg retina tomograph III, and the GDx scanning laser polarimeters, the ability of these devices to identify glaucoma in a screening setting is not well understood for the same reasons as noted by Burr et al.: the lack of a single diagnostic standard for glaucoma and the high degree of variability in the design and conduct of largely cross-sectional studies of diagnostic accuracy. The risk of bias of diagnostic study designs is an additional concern. Many of the glaucoma diagnostic studies included in this review are at high risk of spectrum bias because the investigators compared healthy volunteers with persons with known glaucoma at the time of screening. Enrolling participants who are not representative of those one reasonably expects to encounter in a screening setting results in biased and inflated estimates of diagnostic performance and limits the generalizability of findings. Incorporation bias is of concern, as the reference standard should not include one or more tests that comprise the candidate tests under investigation. But as noted in Burr et al., incorporation bias is a very complex issue when considering the diagnosis of glaucoma. The tests used to diagnose glaucoma are categorized broadly into tests of optic nerve structure or function. To lessen the risk of incorporation bias, one would have to employ a test of structure as the reference standard if the candidate test was one of function or a test of function as the reference if the candidate test were one of structure. However, to do so assumes that "structural (e.g. optic disc) and functional (e.g. visual field) damage occur simultaneously in glaucoma pathogenesis, whereas there is evidence that disc damage precedes manifest visual field loss."[7]

Although we intended to include a discussion of the validity of community and non-eye-care health provider screenings, the studies that met the inclusion criteria were conducted in eye-care provider settings only. Three of the 83 studies included a population-based sample, and the remainder included healthy participants and those with known or suspected glaucoma at the time of screening. Given that the majority of the studies included those with known or suspected disease and that the studies were conducted in eye-care provider settings only, the findings of this Comparative Effectiveness Review are not generalizable to primary care and other non-eye-care settings.

Screening for glaucoma is a difficult problem because it is asymptomatic, has low prevalence, is typically only slowly progressive, and has no agreed-upon standard for diagnosis. These issues, while challenging, might be overcome by a combination of creative thinking with

regard to populations amenable to screening and hard work on the necessary studies and diagnostic standards.

References

1. Quigley HA, Browman AT. The number of people with glaucoma worldwide in 2010 and 2020. Br J Ophthalmol. 2006;90:262-7.
2. The Eye Diseases Prevalence Research Group. Prevalence of open-angle glaucoma among adults in the United States. Arch Ophthalmol. 2004;122 :532-8.
3. Foster PJ, Buhrmann R, Quigley HA, et al. The definition and classification of glaucoma in prevalence surveys. Br J Ophthalmol. 2002;86:238-42.
4. Quigley HA, Vitale S. Models of open-angle glaucoma prevalence and incidence in the United States. Invest Ophthalmol Vis Sci. 1997; 38:83-91.
5. U.S. Preventive Services Task Force. Screening for Glaucoma: Recommendation Statement. AHRQ Publication No. 04-0548-A . Rockville, MD: Agency for Healthcare Research and Quality; 2005.
6. Fleming C, Whitlock E, Beil T, et al. Screening for primary open-angle glaucoma in the primary care setting: an update for the US Preventive Services Task Force. Ann Fam Med. 2005;3(2):167-70.
7. Burr JM, Mowatt G, Hernandez R, et al. The clinical effectiveness and cost-effectiveness of screening for open angle glaucoma: a systematic review and economic evaluation. Health Technol Assess. 2007;11(41).
8. International Classification of Diseases, Ninth Revision (ICD-9). Centers for Disease Control and Prevention; 2009.
9. Li T. Bridging the gap between evidence generation and clinical decision making [Ph.D. dissertation]. Baltimore: The Johns Hopkins University; 2010.
10. Higgins JPT, Altman DG. Chapter 8: Assessing risk of bias in included studies. In: Cochrane Handbook for Systematic Reviews of Interventions Version 5.0.2 (updated September 2009). The Cochrane Collaboration; 2009.
11. Wells GA, Shea B, O'Connell D, et al. The Newcastle-Ottawa Scale (NOS) for Assessing the Quality of Nonrandomized Studies in Meta-Analyses. www.ohri.ca/programs/clinical_epidemiology/oxford.htm. Accessed November 10, 2011.
12. Whiting P, Rutjes AW, Reitsma JB, et al. The development of QUADAS: a tool for the quality assessment of studies of diagnostic accuracy included in systematic reviews. BMC Med Res Methodol. 2003;3(25).
13. Atkins D, Best D, Briss PA, et al. Grading quality of evidence and strength of recommendations. BMJ 2004; 328(7454):1490.
14. Owens DK, Lohr KN, Atkins D, et al. AHRQ series paper 5: grading the strength of a body of evidence when comparing medical interventions-Agency for Healthcare Research and Quality and the Effective Health-care Program. J Clin Epidemiol. 2010;63(5):513-23.
15. Whitlock EP, Lin JS, Chou R, et al. Using existing systematic reviews in complex systematic reviews. Ann Intern Med. 2008;148:776-82.
16. Hatt S, Wormald R, Burr J. Screening for prevention of optic nerve damage due to chronic open angle glaucoma. Cochrane Database Syst Rev. 2006; (4):CD006129.
17. Healey PR, Lee AJ, Aung T, et al. Diagnostic accuracy of the Heidelberg Retina Tomograph for glaucoma: a population-based assessment. Ophthalmology. 2010;117(9):1667-73.
18. Pueyo V, Polo V, Larrosa JM, et al. Ability of optical imaging devices to detect early structural damage in ocular hypertension. Ann Ophthalmol. 2009; 41(3-4):150-6.
19. Zheng Y, Wong TY, Lamoureux E, et al. Diagnostic ability of Heidelberg Retina Tomography in detecting glaucoma in a population setting: the Singapore Malay Eye Study. Ophthalmology. 2010;117(2):290-7.
20. Zeppieri M, Brusini P, Parisi L, et al. Pulsar perimetry in the diagnosis of early glaucoma. Am J Ophthalmol. 2010;149(1):102-12.
21. Saito H, Tsutsumi T, Araie M, et al. Sensitivity and specificity of the Heidelberg Retina Tomograph II Version 3.0 in a population-based study: the Tajimi Study. Ophthalmology. 2009;116(10):1854-61.

22. Medeiros FA, Vizzeri G, Zangwill LM, et al. Comparison of retinal nerve fiber layer and optic disc imaging for diagnosing glaucoma in patients suspected of having the disease. Ophthalmology. 2008;115(8):1340-6.

23. Ferreras A, Pablo LE, Pajarin AB, et al. Diagnostic ability of the Heidelberg Retina Tomograph 3 for glaucoma. Am J Ophthalmol. 2008;145(2):354-9.

24. De Leon-Ortega JE, Sakata LM, Monheit BE, et al. Comparison of diagnostic accuracy of Heidelberg Retina Tomograph II and Heidelberg Retina Tomograph 3 to discriminate glaucomatous and nonglaucomatous eyes. Am J Ophthalmol. 2007;144(4):525-32.

25. Naithani P, Sihota R, Sony P, et al. Evaluation of optical coherence tomography and heidelberg retinal tomography parameters in detecting early and moderate glaucoma. Invest Ophthalmol Vis Sci. 2007;48(7):3138-45.

26. Pueyo V, Polo V, Larrosa JM, et al. Diagnostic ability of the Heidelberg retina tomograph, optical coherence tomograph, and scanning laser polarimeter in open-angle glaucoma. J Glaucoma. 2007;16(2):173-7.

27. Uysal Y, Bayer A, Erdurman C, et al. Sensitivity and specificity of Heidelberg Retinal Tomography II parameters in detecting early and moderate glaucomatous damage: effect of disc size. Clin Experiment Ophthalmol. 2007; 35(2):113-8.

28. Burgansky-Eliash Z, Wollstein G, Bilonick RA, et al. Glaucoma detection with the Heidelberg retina tomograph 3. Ophthalmology. 2007;114(3):466-71.

29. Shah NN, Bowd C, Medeiros FA, et al. Combining structural and functional testing for detection of glaucoma. Ophthalmology. 2006;113(9):1593-602.

30. Medeiros FA, Zangwill LM, Bowd C, et al. Influence of disease severity and optic disc size on the diagnostic performance of imaging instruments in glaucoma. Invest Ophthalmol Vis Sci. 2006;47(3):1008-15.

31. Medeiros FA, Zangwill LM, Bowd C, et al. Comparison of the GDx VCC scanning laser polarimeter, HRT II confocal scanning laser ophthalmoscope, and stratus OCT optical coherence tomograph for the detection of glaucoma. Arch Ophthalmol. 2004;122(6):827-37.

32. Ferreras A, Polo V, Larrosa JM, et al. Can frequency-doubling technology and short-wavelength automated perimetries detect visual field defects before standard automated perimetry in patients with preperimetric glaucoma? J Glaucoma. 2007;16(4):372-83.

33. Danesh-Meyer HV, Gaskin BJ, Jayusundera T, et al. Comparison of disc damage likelihood scale, cup to disc ratio, and Heidelberg retina tomograph in the diagnosis of glaucoma. Br J Ophthalmol. 2006; 90(4):437-41.

34. Moreno-Montanes J, Anton A, Garcia N, et al. Comparison of retinal nerve fiber layer thickness values using Stratus Optical Coherence Tomography and Heidelberg Retina Tomograph-III. J Glaucoma. 2009;18(7):528-34.

35. Bozkurt B, Irkec M, Arslan U. Diagnostic accuracy of Heidelberg Retina Tomograph III classifications in a Turkish primary open-angle glaucoma population. Acta Ophthalmol. 2010; 88(1):125-30.

36. Reddy S, Xing D, Arthur SN, et al. HRT III glaucoma probability score and Moorfields regression across the glaucoma spectrum. J Glaucoma. 2009;18(5):368-72.

37. Oddone F, Centofanti M, Iester M, et al. Sector-based analysis with the Heidelberg Retinal Tomograph 3 across disc sizes and glaucoma stages: a multicenter study. Ophthalmology. 2009;116(6):1106-11.e1-3.

38. Takmaz T, Can I. Comparison of glaucoma probability score and Moorfields regression analysis to discriminate glaucomatous and healthy eyes. Eur J Ophthalmol. 2009;19(2):207-13.

39. Moreno-Montanes J, Anton A, Garcia N, et al. Glaucoma probability score vs Moorfields classification in normal, ocular hypertensive, and glaucomatous eyes. Am J Ophthalmol. 2008;145(2):360-8.

40. Badala F, Nouri-Mahdavi K, Raoof DA, et al. Optic disk and nerve fiber layer imaging to detect glaucoma. Am J Ophthalmol. 2007;144(5):724-32.

41. Ferreras A, Pajarin AB, Polo V, et al. Diagnostic ability of Heidelberg Retina Tomograph 3 classifications: glaucoma probability score versus Moorfields regression analysis. Ophthalmology. 2007;114(11):1981-7.

42. Mansoori T, Viswanath K, Balakrishna N. Quantification of retinal nerve fiber layer thickness in normal eyes, eyes with ocular hypertension, and glaucomatous eyes with SD-OCT. Ophthalmic Surg Lasers Imaging. 2010;41(6):S50-7.

43. Fang Y, Pan YZ, Li M, et al. Diagnostic capability of Fourier-Domain optical coherence tomography in early primary open angle glaucoma. Chin Med J (Engl). 2010;123(15):2045-50.

44. Zhong Y, Zhou X, Cheng Y, et al. Relation between blue-on-yellow perimetry and optical coherence tomography in normal tension glaucoma. Can J Ophthalmol. 2010;45(5):494-500.

45. Pablo LE, Ferreras A, Schlottmann PG. Retinal nerve fibre layer evaluation in ocular hypertensive eyes using optical coherence tomography and scanning laser polarimetry in the diagnosis of early glaucomatous defects. Br J Ophthalmol. 2011 Jan;95(1):51-5. Epub 2010 June 24.

46. Rao HL, Zangwill LM, Weinreb RN, et al. Comparison of different spectral domain optical coherence tomography scanning areas for glaucoma diagnosis. Ophthalmology. 2010;117(9):1692-9, 1699.e1.

47. Leite MT, Zangwill LM, Weinreb RN, et al. Effect of disease severity on the performance of Cirrus spectral-domain OCT for glaucoma diagnosis. Invest Ophthalmol Vis Sci. 2010; 51(8):4104-9.

48. Li G, Fansi AK, Boivin JF, et al. Screening for glaucoma in high-risk populations using optical coherence tomography. Ophthalmology. 2010;117(3):453-61.

49. Park SB, Sung KR, Kang SY, et al. Comparison of glaucoma diagnostic capabilities of Cirrus HD and Stratus optical coherence tomography. Arch Ophthalmol. 2009;127(12):1603-9.

50. Chang RT, Knight OJ, Feuer WJ, et al. Sensitivity and specificity of time-domain versus spectral-domain optical coherence tomography in diagnosing early to moderate glaucoma. Ophthalmology. 2009;116(12):2294-9.

51. Moreno-Montanes J, Olmo N, Alvarez A, et al. Cirrus high-definition optical coherence tomography compared with Stratus optical coherence tomography in glaucoma diagnosis. Invest Ophthalmol Vis Sci. 2010;51(1):335-43.

52. Sehi M, Grewal DS, Sheets CW, et al. Diagnostic ability of Fourier-domain vs time-domain optical coherence tomography for glaucoma detection. Am J Ophthalmol. 2009;148(4):597-605.

53. Yuksel N, Altintas O, Ozkan B, et al. Discriminating ability of optical coherence tomography data in staging glaucomatous damage. Can J Ophthalmol. 2009;44(3):297-307.

54. Sung KR, Kim DY, Park SB, et al. Comparison of retinal nerve fiber layer thickness measured by Cirrus HD and Stratus optical coherence tomography. Ophthalmology. 2009;16(7):1264-70, 1270.e1.

55. Polo V, Larrosa JM, Ferreras A, et al. Retinal nerve fiber layer evaluation in open-angle glaucoma. Optimum criteria for optical coherence tomography. Ophthalmologica. 2009; 223(1):2-6.

56. Lu AT, Wang M, Varma R, et al. Combining nerve fiber layer parameters to optimize glaucoma diagnosis with optical coherence tomography. Ophthalmology. 2008;115(8):1352-7, 1357.e1-2.

57. Nouri-Mahdavi K, Nikkhou K, Hoffman DC, et al. Detection of early glaucoma with optical coherence tomography (StratusOCT). J Glaucoma. 2008;17(3):183-8.

58. Takahashi H, Chihara E. Impact of diabetic retinopathy on quantitative retinal nerve fiber layer measurement and glaucoma screening. Invest Ophthalmol Vis Sci. 2008;49(2):687-92.

59. Sehi M, Ume S, Greenfield DS. Scanning laser polarimetry with enhanced corneal compensation and optical coherence tomography in normal and glaucomatous eyes. Invest Ophthalmol Vis Sci. 2007;48(5):2099-104.

60. Hong S, Chung W, Hong YJ, et al. Discriminating ability of Humphrey matrix perimetry in early glaucoma patients. Ophthalmologica. 2007; 221(3):195-9.

61. Brusini P, Salvetat ML, Zeppieri M, et al. Comparison between GDx VCC scanning laser polarimetry and Stratus OCT optical coherence tomography in the diagnosis of chronic glaucoma. Acta Ophthalmol Scand. 2006;84(5):650-5.

62. Sihota R, Sony P, Gupta V, et al. Diagnostic capability of optical coherence tomography in evaluating the degree of glaucomatous retinal nerve fiber damage. Invest Ophthalmol Vis Sci. 2006;47(5):2006-10.

63. Chen HY, Wang TH, Lee YM, et al. Retinal nerve fiber layer thickness measured by optical coherence tomography and its correlation with visual field defects in early glaucoma. J Formos Med Assoc. 2005;104(12):927-34.

64. Bagga H, Feuer WJ, Greenfield DS. Detection of psychophysical and structural injury in eyes with glaucomatous optic neuropathy and normal standard automated perimetry. Arch Ophthalmol. 2006;124(2):169-76.

65. Leung CK, Chan WM, Yung WH, et al. Comparison of macular and peripapillary measurements for the detection of glaucoma: an optical coherence tomography study. Ophthalmology. 2005;112(3):391-400.

66. Medeiros FA, Zangwill LM, Bowd C, et al. Evaluation of retinal nerve fiber layer, optic nerve head, and macular thickness measurements for glaucoma detection using optical coherence tomography. Am J Ophthalmol. 2005;139(1):44-55.

67. Wollstein G, Ishikawa H, Wang J, et al. Comparison of three optical coherence tomography scanning areas for detection of glaucomatous damage. Am J Ophthalmol. 2005;139(1):39-43.

68. Leung CK, Yung WH, Ng AC, et al. Evaluation of scanning resolution on retinal nerve fiber layer measurement using optical coherence tomography in normal and glaucomatous eyes. J Glaucoma. 2004;13(6):479-85.

69. Mori S, Hangai M, Sakamoto A, et al. Spectral-domain optical coherence tomography measurement of macular volume for diagnosing glaucoma. J Glaucoma. 2010;19(8):528-34.

70. Kim NR, Hong S, Kim JH, et al. Comparison of macular ganglion cell complex thickness by Fourier-Domain OCT in normal tension glaucoma and primary open-angle glaucoma. J Glaucoma. 2011 June 22 [Epub ahead of print].

71. Oddone F, Centofanti M, Tanga L, et al. Influence of disc size on optic nerve head versus retinal nerve fiber layer assessment for diagnosing glaucoma. Ophthalmology. 2011;118(7):1340-7.

72. Girkin CA, Liebmann J, Fingeret M, et al. The effects of race, optic disc area, age, and disease severity on the diagnostic performance of spectral-domain optical coherence tomography. Invest Ophthalmol Vis Sci. 2011;52(9):6148-53.

73. Leite MT, Rao HL, Zangwill LM, et al. Comparison of the diagnostic accuracies of the Spectralis, Cirrus, and RTVue optical coherence tomography devices in glaucoma. Ophthalmology. 2011;118(7):1334-9.

74. Mansoori T, Viswanath K, Balakrishna N. Quantification of retinal nerve fiber layer thickness in normal eyes, eyes with ocular hypertension, and glaucomatous eyes with SD-OCT. Ophthalmic Surg Lasers Imaging. 2010; 41(Suppl):S50-7.

75. Horn FK, Mardin CY, Bendschneider D, et al. Frequency doubling technique perimetry and spectral domain optical coherence tomography in patients with early glaucoma. Eye. 2011;25(1):17-29.

76. Shoji T, Sato H, Ishida M, et al. Assessment of glaucomatous changes in subjects with high myopia using spectral domain optical coherence tomography. Invest Ophthalmol Vis Sci. 2011;52(2):1098-102.

77. Benitez-del-Castillo J, Martinez A, Regi T. Diagnostic capability of scanning laser polarimetry with and without enhanced corneal compensation and optical coherence tomography. Eur J Ophthalmol. 2011;21(3):228-36.

78. Aptel F, Sayous R, Fortoul V, et al. Structure-function relationships using spectral-domain optical coherence tomography: comparison with scanning laser polarimetry. Am J Ophthalmol. 2010;150(6):825-33.

79. Cho JW, Sung KR, Hong JT, et al. Detection of glaucoma by spectral domain-scanning laser ophthalmoscopy/optical coherence tomography (SD-SLO/OCT) and time domain optical coherence tomography. J Glaucoma. 2011; 20(1):15-20.

80. Reus NJ, Lemij HG, Garway-Heath DF, et al. Clinical assessment of stereoscopic optic disc photographs for glaucoma: the European Optic Disc Assessment Trial. Ophthalmology. 2010;117(4):717-23.

81. Francis BA, Varma R, Vigen C, et al. Population and high-risk group screening for glaucoma: the Los Angeles Latino Eye Study. Invest Ophthalmol Vis Sci. 2011; 52(9):6257-64.

82. Medeiros FA, Zangwill LM, Bowd C, et al. Comparison of scanning laser polarimetry using variable corneal compensation and retinal nerve fiber layer photography for detection of glaucoma. Arch Ophthalmol. 2004;122(5):698-704.

83. Hong S, Ahn H, Ha SJ, et al. Early glaucoma detection using the Humphrey Matrix Perimeter, GDx VCC, Stratus OCT, and retinal nerve fiber layer photography. Ophthalmology. 2007;114(2):210-5.

84. Chen HY, Huang ML, Tsai YY, et al. Comparing glaucomatous optic neuropathy in primary open angle and primary angle closure glaucoma eyes by scanning laser polarimetry-variable corneal compensation. J Glaucoma. 2008;17(2):105-10.

85. Parikh RS, Parikh SR, Kumar RS, et al. Diagnostic capability of scanning laser polarimetry with variable cornea compensator in Indian patients with early primary open-angle glaucoma. Ophthalmology. 2008;115(7):1167-72.e1.

86. Medeiros FA, Bowd C, Zangwill LM, et al. Detection of glaucoma using scanning laser polarimetry with enhanced corneal compensation. Invest Ophthalmol Vis Sci. 2007;48(7):3146-53.

87. Mai TA, Reus NJ, Lemij HG. Diagnostic accuracy of scanning laser polarimetry with enhanced versus variable corneal compensation. Ophthalmology. 2007;114(11):1988-93.

88. Kanamori A, Nagai-Kusuhara A, Escano MF, et al. Comparison of confocal scanning laser ophthalmoscopy, scanning laser polarimetry and optical coherence tomography to discriminate ocular hypertension and glaucoma at an early stage. Graefes Arch Clin Exp Ophthalmol. 2006; 244(1):58-68.

89. Da Pozzo S, Iacono P, Marchesan R, et al. Scanning laser polarimetry with variable corneal compensation and detection of glaucomatous optic neuropathy. Graefes Arch Clin Exp Ophthalmol. 2005; 243(8):774-9.

90. Reus NJ, Lemij HG. Diagnostic accuracy of the GDx VCC for glaucoma. Ophthalmology. 2004;111(10):1860-5.

91. Salim S, Netland PA, Fung KH, et al. Assessment of the Student Sight Savers Program methods for glaucoma screening. Ophthalmic Epidemiol. 2009;16(4):238-42.

92. Pierre-Filho Pde T, Schimiti RB, de Vasconcellos JP, et al. Sensitivity and specificity of frequency-doubling technology, tendency-oriented perimetry, SITA Standard and SITA Fast perimetry in perimetrically inexperienced individuals. Acta Ophthalmol Scand. 2006;84(3):345-50.

93. Tafreshi A, Sample PA, Liebmann JM, et al. Visual function-specific perimetry to identify glaucomatous visual loss using three different definitions of visual field abnormality. Invest Ophthalmol Vis Sci. 2009;50(3):1234-40.

94. Racette L, Medeiros FA, Zangwill LM, et al. Diagnostic accuracy of the Matrix 24-2 and original N-30 frequency-doubling technology tests compared with standard automated perimetry. Invest Ophthalmol Vis Sci. 2008;49(3):954-60.

95. Leeprechanon N, Giangiacomo A, Fontana H, et al. Frequency-doubling perimetry: comparison with standard automated perimetry to detect glaucoma. Am J Ophthalmol. 2007;143(2):263-71.

96. Burgansky-Eliash Z, Wollstein G, Patel A, et al. Glaucoma detection with matrix and standard achromatic perimetry. Br J Ophthalmol. 2007; 91(7):933-8.

97. Sample PA, Medeiros FA, Racette L, et al. Identifying glaucomatous vision loss with visual-function-specific perimetry in the Diagnostic Innovations in Glaucoma Study. Invest Ophthalmol Vis Sci. 2006;47(8):3381-9.

98. Salvetat ML, Zeppieri M, Tosoni C, et al. Non-conventional perimetric methods in the detection of early glaucomatous functional damage. Eye. 2010;24(5):835-42.

99. Ng M, Racette L, Pascual JP, et al. Comparing the full-threshold and Swedish interactive thresholding algorithms for short-wavelength automated perimetry. Invest Ophthalmol Vis Sci. 2009;50(4):1726-33.

Introduction

The Agency for Healthcare Research and Quality (AHRQ) Effective Health Care Program requested a Comparative Effectiveness Review of screening for open-angle glaucoma. The topic was selected through the Effective Health Care Program nomination process and refined with input from clinicians, consumers, professional organizations and other stakeholders with experience relevant to glaucoma screening and treatment.

Background

Glaucoma is a leading cause of visual impairment and blindness and affects approximately 60.5 million people worldwide.[1,2] Although glaucoma may be characterized by optic nerve damage, visual field loss and elevated intraocular pressure, there is no consensus definition for confirming diagnosis.[3] Damage is irreversible, so early detection can prevent severe vision loss. Open-angle glaucoma (OAG), the most common subtype of the disease, affects more than 2.5 million people in the United States, with a median age-adjusted prevalence of 4.6 percent, and 1.6 percent, among black and white people, respectively (based on year 2000 estimates).[4]

Unfortunately, it has been shown that only half of the prevalent cases of glaucoma have been identified in the United States due to at least two factors[4]. First, glaucoma is an asymptomatic disease that patients do not notice until the onset of advanced disease, accompanied by severe vision loss. Second, there is no single test to identify people with glaucoma, which has severely hampered the establishment of screening-based programs to detect the disease.

The March 2005 U.S. Preventive Services Task Force (USPSTF) recommendation on screening for glaucoma stated that there was "insufficient evidence to recommend for or against screening adults for glaucoma." The USPSTF noted that intraocular pressure measurement and optic nerve head assessment alone have limited effectiveness as population-based screening tools.[5,6]The USPSTF also concluded that methods used to assess visual field loss may be impractical for population-based screening due to the length of time required for testing and the challenge of equipment portability. Since 2005, there have been significant advances in the devices used to test optic nerve structure and function.[5,6] with several published studies on new diagnostic tests, such as frequency-doubling technology, used to assess visual field loss.[6] Because of this new evidence, we believe a re-evaluation of the safety and effectiveness of population-based glaucoma screening is warranted.

Purpose for Evidence Report

The objective of this review was to summarize the evidence regarding the safety and effectiveness of screening-based programs for OAG with a specific focus on the effects of screening on visual impairment, patient reported outcomes, intraocular pressure, visual field loss, optic nerve damage, and adverse effects. The effect of screening on these outcomes is considered in the context of treatment of those who, after having been screened, are diagnosed as having glaucoma. This review also includes a summary of the diagnostic accuracy of screening examinations and tests for OAG.

Key Questions

Screening for a medical condition in asymptomatic individuals may be considered to be beneficial when the condition has a significant individual or population burden; is associated

with adverse effects on the mental or physical health of the individual; there is at least one accurate test that detects the condition during its asymptomatic or early clinical stage; treatment of the condition at an asymptomatic or early stage is significantly more effective at improving important health outcomes than treatment once it is symptomatic; and the potential harm to the individual due to screening and early intervention is limited and outweighed by the benefits. Following these requirements, we considered and compared, where possible, the safety and effectiveness of screening-based programs for OAG as a tool for preventing or greatly reducing loss of sight due to the disease. It should be noted, however, that early treatment is important for determining the indirect chain of evidence for the effectiveness of screening. The concurrent AHRQ report titled Treatment for Glaucoma: Comparative Effectiveness presents a review of the effectiveness of treatment for open-angle glaucoma.

- **Key Question 1a:** Does a screening-based program for OAG lead to less visual impairment when compared with no screening program?
- **Key Question 1b:** How does visual impairment vary when comparing different screening-based programs for OAG?
- **Key Question 2a:** Does a screening-based program for OAG lead to improvements in patient-reported outcomes when compared with no screening?
- **Key Question 2b:** How do patient-reported outcomes vary when comparing different screening-based programs for OAG?
- **Key Question 3:** What is the predictive value of screening tests for OAG?
- **Key Question 4a:** Does a screening-based program for OAG lead to reductions in intraocular pressure when compared with no screening program?
- **Key Question 4b:** How does intraocular pressure vary when comparing different screening-based programs for OAG?
- **Key Question 5a:** Does a screening-based program lead to a slowing of the progression of optic nerve damage and visual field loss when compared with no screening program?
- **Key Question 5b:** How do optic nerve damage and visual field loss vary when comparing different screening-based programs for OAG?
- **Key Question 6:** What are the harms associated with screening for OAG?

Methods

Topic Development

AHRQ requested that the Johns Hopkins University Evidence Based Practice Center (JHU EPC) assist with the formulation and refinement of the Comparative Effectiveness Review (CER) topic, effectiveness of screening and treatment for glaucoma. In consultation with AHRQ, the JHU EPC investigators identified a small group of stakeholders to serve as members of a Key Informant Group. The Key Informant Group helped shape the Key Questions (KQs) relevant to the topic by providing input regarding the populations and clinical subgroups; interventions; and outcomes of interest to clinicians, policy makers, payers, and consumers.

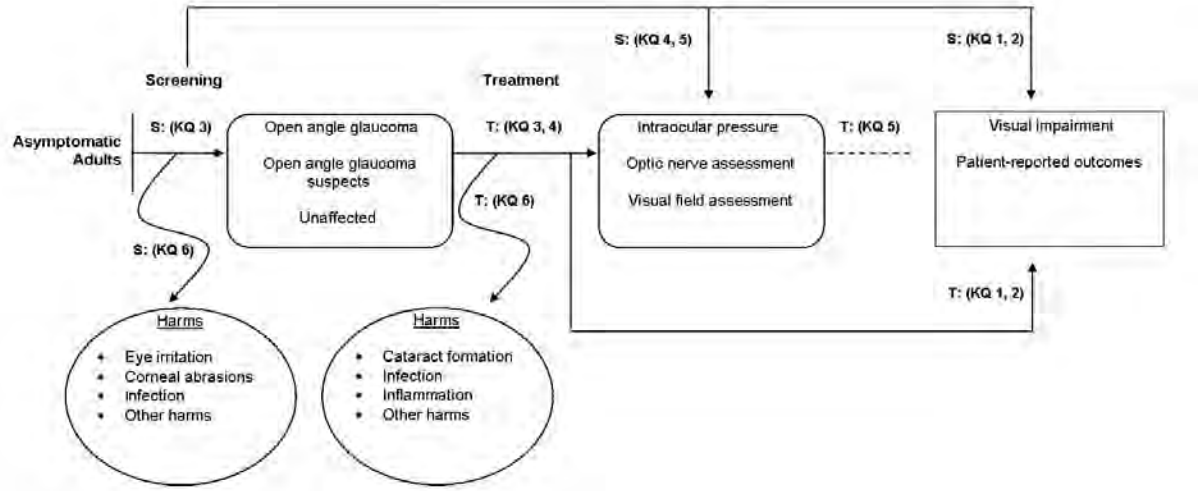
The EPC investigators incorporated the feedback of the Key Informants into a draft of the KQs, analytic framework, and inclusion criteria. A draft of the KQs was posted on the AHRQ Web site for public comment from 22 April to 20 May 2010. The investigators finalized the inclusion criteria after considering these public comments.

A Technical Expert Panel (TEP) was selected to provide broad expertise and perspectives specific to the topic. The TEP reviewed the proposed methodological approach for completing the comparative effectiveness review and provided information to the EPC to aid in the refinement of the inclusion criteria and literature search strategies. The final protocol titled The Comparative Effectiveness of Screening for Open-Angle Glaucoma was posted to the AHRQ Web site on 16 November 2010.

Analytic Framework

The analytic framework (Figure 1) depicts the impact of both screening and treatment for OAG. It depicts the KQs within the context of the inclusion criteria described in the following sections. The figure depicts how screening-based programs (which may incorporate treatment when indicated) may reduce visual impairment (S: KQ1) and/or improve patient reported outcomes (S: KQ2), reduce intraocular pressure (S: KQ4) and possibly slow the progression of optic nerve damage and/or visual field loss (S: KQ5). The figure also incorporates the potential predictive value of screening-based programs to detect OAG and OAG suspects (S: KQ3). Finally, the potential for harms of screening (S: KQ6) are illustrated in the framework.

Figure 1. Analytic framework for screening and treatment for open-angle glaucoma



KQ = Key Question; T = Key questions for the Comparative Effectiveness of Treatment for Glaucoma; S = Key questions for the Comparative Effectiveness of Screening for Glaucoma

Study Selection

Types of Studies

We included randomized controlled trials, quasi-randomized controlled trials, and observational study designs, including cohort and case control studies, for KQs 1 through 6. For KQ3 we also included cross-sectional studies, study designs in which all tests (including the index, comparator, and reference standard) were performed on all participants, and designs in which participants were randomized to one test (among the index and potential comparator(s)) but all were evaluated with the reference standard.[7] We excluded case series of fewer than 100 participants as studies smaller than this are expected to identify events occurring at a rate of less than 3 percent. We excluded conference abstracts that met our study inclusion criteria as we did not have the resources to contact the study investigators with additional queries before the conclusion of data abstraction. We also included systematic reviews that addressed the KQs.

We excluded studies that addressed the following:

- Prevalence of glaucoma in a specific population unless the studies also included tests of diagnostic accuracy
- Disease progression that did not include participants previously screened for glaucoma
- Risk factors for glaucoma

Types of Participants

We included studies of adult (as defined by included studies) asymptomatic participants in general or high-risk populations. For both populations we excluded studies of participants previously tested, diagnosed with glaucoma, or presenting with symptoms known to be related to a diagnosis of glaucoma. Asymptomatic high-risk populations included those with a family history of glaucoma; those from specific racial/ethnic groups; those with specific ocular or other medical conditions, as defined by included studies (e.g., diabetes); and older age groups, as defined by included studies.

We also included studies of suspected OAG subpopulations, which included participants identified from prior testing as possibly having glaucoma or as having a risk factor for glaucoma, e.g., high intraocular pressure, but with an unconfirmed diagnosis. We excluded studies of participants with known glaucoma at the time of screening (KQs 1, 2, 4 and 5) and those that included the healthy eye of a participant with known glaucoma (KQ 3). We excluded studies in which the candidate tests were performed on a sample of healthy volunteers only. We did not exclude studies that enrolled healthy volunteers in addition to those with suspected glaucoma at the time of screening.

Interventions

We included studies of the following screening tests conducted alone or in any possible combination (including multicomponent simultaneous or sequential testing):

- Direct and indirect ophthalmoscopy
- Fundus photography or computerized imaging of the posterior pole, optic disc or retinal nerve (optical coherence tomography (OCT; with the exception of OCT 1 and OCT 2), retinal tomography, scanning laser polarimetry)
- Pachymetry (corneal thickness measurement) when used in conjunction with another test to diagnose glaucoma (We excluded studies where pachymetry was used alone.)
- Perimetry (including short-wavelength, high-pass, motion, flicker perimetry, yellow and blue perimetry)
- Tonometry (contact and non-contact tonometry)

We excluded studies of the following screening tests and related analysis software that are either not commercially available for screening or are not commonly or no longer used in the diagnosis of glaucoma:

- Contrast sensitivity and visual acuity
- Electroretinography
- Heidelberg Retina Tomograph (HRT) 1 (confocal scanning laser ophthalmoscope)
- Optical coherence tomography (OCT) 1 and OCT 2
- Tests of color vision
- Versions of the GDx,(scanning laser polarimeter) without corneal compensation
- Water drinking tests

We also excluded studies that examined only technical aspects of included devices, e.g., usability, technician training.

Screening and Diagnostic Device Descriptions

Below are detailed descriptions of the devices and tests included in this comparative effectiveness review including mechanism, operation, and skill required to complete and interpret each test.

Tests of Optic Nerve Structure

Heidelberg Retinal Tomography (HRT)

The Heidelberg Retina Tomograph (HRT) is a scanning laser ophthalmoscope that can create three-dimensional images of the retina and optic nerve head. After the images are collected, the device analyzes them to calculate values such as the area of the optic nerve head, the area and

volume of the neuro-retinal rim, the ratio of the area of the optic nerve head "cup" to the disc, and many others. The current versions of the device also compare values obtained for a particular patient to those of a population of healthy persons to estimate the probability of optic nerve disease consistent with glaucoma. Reports of these data can then be used by clinicians to diagnose either new or progressive disease.

The device itself consists of a table-mounted unit with imaging optics and a connected computer to allow for image acquisition, and management of patient data. As such, the system is not easily portable from place to place. Operation of the device also requires personnel who have been trained to operate the software and hardware. This training includes not only the basics of entering patient information but also trouble-shooting problems with image quality and patient positioning.

Optical Coherence Tomography (OCT)

An optical interferometer is used to create cross-sectional images of ocular structures including the retina and optic nerve head. Once the images are collected, they can be analyzed and various anatomic layers can be segmented for further analysis. Such analysis of the retinal nerve fiber layer and structure of the optic nerve head are most relevant to the diagnosis of glaucoma.

The original OCT devices all utilized time-domain analysis of the collected data. Thus, the time to collect an image was a significant limitation to the resolution that could be achieved. More recently, spectral domain devices have become available; they can collect higher resolution images in the same time required to collect lower resolution images using the time domain devices.

As with the HRT, the OCT machines all consist of a table-mounted unit with the optics connected to a computer for image acquisition and analysis. There are more portable versions of the optics available but they still require a connection to computational power for image analysis. OCT devices also require trained personnel to operate them effectively.

Optic Disc Photography

After hand drawing, photographs are perhaps the earliest method of documenting the appearance of the optic nerve head. Photographs can be taken as single images, nonsimultaneous stereo pairs in which the camera is moved slightly between images and simultaneous stereo pairs in which two images are captured simultaneously. The advantage of stereo photographs is that they enhance the reviewer's ability to assess optic nerve structures. Although optic disc photographs were first captured on film, they now are captured using digital technology. Historically, obtaining good quality photographs required a trained ophthalmic photographer and an expensive camera system. As the systems have become more computerized and the optics more refined, the skill required to acquire adequate images has declined to the point where some telemedicine systems no longer require specially trained operators.

The analysis of optic nerve photographs is currently less quantitative than the imaging techniques above. Although computerized analysis of digital images is improving, as such, good quality evaluation of disc photographs requires significant skill on the part of the examiner.

Retinal Nerve Fiber Layer (RNFL) Photography

A specialized photographic technique using red-free (green) light to image the retinal nerve fiber layer. Green light is absorbed by the melanin in the retinal nerve fiber (RNFL) and the

striations become visible as they radiate around the optic nerve. RNFL photographs permit comparisons over time and can help detect diffuse or localized RNFL loss consistent with glaucoma. RNFL photographs are difficult and often uncomfortable for the patient and require specialized equipment and trained photographers. For these reasons and because they are difficult for clinicians to interpret, they rarely are used in clinical practice.

Scanning Laser Polarimetry (SLP)

The scanning laser polarimeter assesses the retinal nerve fiber layer (RNFL) using polarized light to measure the phase shift that occurs due to the presence of repetitive micro-structures. The size of the shift depends on both the thickness and integrity of the RNFL. Because the cornea also contains repeating structures that affect polarized light, the commercial version of the scanning laser polarimeter has undergone multiple revisions to accommodate this effect. The images collected by SLP can be analyzed to assess the thickness of the RNFL, which is directly related to glaucomatous damage.

The company that manufacturers the commercially available SLP (GDx, Carl Zeiss Meditec) has designed the device as a single table-top unit that does not require a separate computer unlike the OCT and HRT. As with other available devices, however, training is required to obtain usable images reliably.

Tests of Optic Nerve Function

Frequency Doubling Technology (FDT)

Frequency doubling technology uses a perimeter that takes advantage of an alternative visual stimulus to assess the visual field. It presents flickering stimuli of varying contrast in various locations. The FDT perimeter was the first instrument using this technology. It is small, portable and can be administered in a screening mode in 45 to 90 seconds. The more recent instrument using this technology is the Humphrey Matrix, which uses smaller targets and has increased the number of locations tested in the visual field. The FDT is smaller than the Humphrey Matrix but both are relatively portable and technicians can be trained quickly to operate these instruments.

Goldmann Applanation Tonometry

Tonometry is the measurement of intraocular pressure (IOP). Applanation tonometry indirectly assesses the IOP by measuring the pressure required to flatten a certain area of the cornea. The Goldmann applanation tonometer uses a standard probe and is the current standard method to measure IOP. The cornea must be anesthetized with an eyedrop. The instrument is mounted on a biomicroscope. Most biomicroscopes are not portable and skilled training is needed for a technician or clinician to perform tonometry.

Noncontact Tonometry

Noncontact tonometry, also called air-puff tonometry, uses a rapid pulse of air to flatten the cornea. The IOP is estimated by an electro-optical system based on the time needed for the jet of air to flatten the cornea. It takes less time to flatten a soft eye (low IOP) than a hard eye (high IOP). The eye does not need to be anesthetized. Although the pulse is very rapid, patients frequently are startled by this test. Training to operate the instrument is easy and the table-mounted instrument can be transported when necessary.

Standard Automated Perimetry (SAP)

A perimeter can measure in a systematic way the visual field of an eye by presenting light stimuli of varying intensity at various locations. From the point of fixation both the width and sensitivity of the visual field can reveal defects typical of glaucoma optic nerve damage. By varying the size and brightness of the light target at multiple locations and asking the subject to respond if the image is seen the resultant score is a critical tool in both the diagnosis and monitoring of the progression of glaucoma. Standard automated perimetry (SAP) uses a white light stimulus on a white background to determine threshold values. Two instruments in wide use are the Humphrey field analyzer (HFA) and the Octopus. An alternative method of assessing the visual field is short-wavelength automated perimetry (SWAP), which uses a blue stimulus on a yellow background and is thought to be more sensitive for detecting early glaucoma. These instruments are all automated and administered by a technician after a short training time. Because they are subjective, perimetry can be fatiguing for the patient to perform. Furthermore, all devices are large enough to require a tabletop, though some are small enough to be reasonably portable.

Comparators/Reference Standards

KQs 1, 2, 4, 5, and 6 explore comparisons of the interventions mentioned above conducted alone or in any possible combination as a part of a screening-based program to no screening program (including usual care, case finding, and referral) and to different screening-based programs (above tests conducted alone or in any possible combination). KQ3 explores comparisons of screening/diagnostic tests to the reference standards of confirmed OAG at the time of followup or OAG requiring treatment (diagnosed by an ophthalmologist using objective assessments). The diagnosis should have included a clinical examination with measurement of intraocular pressure, assessment of the visual field and assessment of the optic nerve head and/or retinal nerve fiber layer, or review of disc photographs. We considered other methods to confirm diagnosis as defined by included studies whenever the examinations/tests were specified in the report. We acknowledge that there is no consensus on the gold standard test or combination of tests for the identification of patients with OAG. We adapted the reference standards for KQ3 from a diagnostic test accuracy review conducted by Burr (2007).[7]

Outcomes

KQ1

Primary Outcome

We identified studies that reported the proportion of participants with moderate, severe, and profound visual impairment as defined in the International Classification of Diseases, Clinical Modification, 9th Revision (Appendix D).[8] We also considered other measurements of visual impairment as defined by included studies.

Secondary Outcome

We also considered visual acuity outcomes (e.g., mean visual acuity or proportion of participants in pre-specified visual acuity categories) reported in the included studies and as measured with Snellen, or any other valid chart that yields scores that can be converted to Snellen fractions or logarithm of the minimum angle of resolution (logMAR) values.

KQ2

We identified studies that reported the participants' mean total or relevant item/subscale scores as measured by any validated questionnaire, e.g., National Eye Institute Visual Function Questionnaire, to compare the following patient-reported outcomes among the treatment groups of interest:

- Vision-related quality of life (vision-related functional decrement, compared to individuals without eye or vision problems, as well as the impact of functional loss on activities of daily living) (primary outcome)
- Patient satisfaction (secondary outcome)

KQ3

We extracted the number of participants in the following categories: true positives, true negatives, false positives, and false negatives in order to calculate sensitivity and specificity. We also included studies that reported sensitivity, specificity, or area under the ROC curve (AUC).

KQ4

We extracted the mean intraocular pressure to analyze the differences between/among the groups of interest.

KQ5

We compared the proportion of participants with progressive optic nerve damage as defined by included studies and as observed via fundus photography or other imaging of the posterior pole and the proportion of participants with progression of visual field loss as defined by included studies.

KQ6

We recorded the proportion of participants experiencing the following adverse events (adapted from the U.S. Preventive Services Task Force, http://www.ahrq.gov/clinic/uspstf05/glaucoma/glaucrs.htm) for each group of interest:

- Corneal abrasions
- Distortion of sense of taste (due to anesthetic use)
- Examination apprehension
- Eye irritation
- Harms related to over diagnosis
- Infection
- Psychological effects related to a glaucoma diagnosis or misdiagnosis

We also planned to report other harms as reported in included studies. We note that different screening and followup methods may result in different harms.

Timing of Outcome

We assessed outcomes for KQs 1, 2, 4, and 5 at 1 year of followup and at annual intervals thereafter. There was no minimum length of followup for outcomes related to KQs 3 and 6.

Setting

Settings for this review included community screenings, non-eye care health provider settings, eye care provider clinical settings (ophthalmologists and optometrists), and telemedicine.

Search Strategy

We searched the following databases for primary studies: MEDLINE®, Embase, LILACS (Latin American and Caribbean Literature on Health Sciences), and CENTRAL (the Cochrane Central Register of Controlled Trials). We developed a search strategy for MEDLINE, accessed via PubMed, based on an analysis of the medical subject headings, (MeSH) terms, and text words of key articles identified a priori. We adapted this search strategy for searches of Embase (using EMTREE terms), CENTRAL, and LILACS (Appendix A). We searched the literature without imposed language, sample size or date restrictions. We searched relevant systematic reviews to identify any additional studies that should be included. We searched from the beginning of each database through 6 October 2011.

We also conducted a search in MEDLINE and CENTRAL for systematic reviews that addressed the key questions of interest. The search included the topic strategy as noted in the Appendix combined with the term "AND systematic[sb]" and was limited to systematic reviews published from 2009 to 2011. We searched MEDION (www.mediondatabase.nl) for related diagnostic accuracy reviews (KQ3). The search for systematic reviews was conducted on 2 March 2011.

We screened an existing database of eye and vision systematic reviews prepared by Li (2010) to identify relevant OAG systematic reviews published prior to 2009.[9] Li (2010) searched MEDLINE, Embase, and CENTRAL from inception to September 2009 and two reviewers screened titles, abstracts, and full text manuscripts to identify eye and vision systematic reviews.

Abstract Screening

We developed an abstract screening form. All investigators pilot tested the form using a set of candidate abstracts identified from the electronic searches. We screened potentially relevant citations (primary studies and systematic reviews) via the Web-based systematic review software DistillerSR (http://systematic-review.net/). All citations identified by the search strategies were uploaded to DistillerSR. Two reviewers independently assessed titles and abstracts resulting from the literature searches according to the inclusion criteria. We classified the titles and abstracts as "include," "exclude," or "unsure." We resolved disagreements about eligibility through discussion among reviewers. For non-English language articles, we initially reviewed for inclusion articles with English abstracts, but decided to exclude all non-English articles as we were unable to identify appropriate translation services for all non-English abstracts and/or the full text of potentially eligible articles prior to the start of full text screening. A copy of the abstract screening form is included in Appendix B.

Full-Text Screening

Two reviewers independently applied the same inclusion criteria as used during abstract screening. Citations tagged as "unsure" by both reviewers, "unsure" by one reviewer and "include" by the other, or "include" by both reviewers, were promoted to full-text screening. We excluded non-English language articles from further consideration at this stage. We resolved any

disagreements regarding inclusion through discussion between reviewers, or, as needed, among all investigators during a team meeting. A copy of the full-text screening form is included in Appendix B.

Data Abstraction

Data abstraction forms were designed and pilot tested. One reviewer extracted descriptions of the study, including details about the population, devices/tests and outcomes of interest, using the systematic review software DistillerSR. A second reviewer verified the data. We resolved disagreements through discussion. A copy of the data abstraction forms is included in Appendix B.

Risk of Bias Assessment

We used the Cochrane Collaboration's tool for assessing the risk of bias of randomized and quasi-randomized trials. Two reviewers assessed the included studies for sources of systematic bias according to the guidelines in Chapter 8 of the Cochrane Handbook for Systematic Reviews of Interventions and evaluated the studies for the following criteria: sequence generation and allocation concealment (selection bias), masking of participants, study investigators, and outcome assessors (detection bias), incomplete outcome data (attrition bias), selective outcome reporting (reporting bias), and other sources of bias.[10] Masking of investigators and participants may not have been possible with some of the tests being examined, but was noted when mentioned. We reported judgments for each criterion as "Low risk of bias," "High risk of bias," or "Unclear risk of bias (information is insufficient to assess)." The two reviewers resolved disagreements through discussion.

Two reviewers assessed the methodological rigor of observational studies using a modified version of the Newcastle Ottawa Scale.[11] The Newcastle Ottawa Scale includes domains to assess the quality of study group selection (representativeness, selection, case definitions); comparability of cohorts/cases and controls on the basis of the design or analysis; and ascertainment of exposure(s) or outcome(s), adequacy of followup, non-response rate and financial or other conflicts of interest. Each item query required a yes, no, or unable to determine/not reported response.

For KQ3, we used the Quality Assessment of Diagnostic Accuracy Studies (QUADAS) checklist, which is a specific risk of bias assessment for diagnostic accuracy studies.[12] The QUADAS tool includes 14 items that evaluate numerous domains including representativeness, inclusion/exclusion criteria, choice of reference standard, masked interpretation of results of tests and reference standard, and study withdrawal. We reported judgments for each checklist item as "Yes," "No," or "Unclear."

We used a tool adapted by Li (2010) from the Critical Appraisal Skills Program, Assessment of Multiple Systematic Reviews, and the Preferred Reporting Items for Systematic Reviews and Meta-analyses statement to assess the methodological quality of systematic reviews.[9] We used the following criteria, adapted from Li, to determine which were of sufficient quality to be considered for inclusion in this review: comprehensive search for primary studies (searches of more than one bibliographic database); inclusion of a risk of bias assessment of primary studies; and conduct of appropriate analytic methods for meta-analyses (no pooled arm analysis).

Rating of Evidence

We assessed the quantity, quality and consistency of the body of available evidence addressing KQ1 through KQ6. We used an evidence grading scheme recommended by the Grading of Recommendation Assessment, Development and Evaluation (GRADE) Working Group, adapted by AHRQ in the Methods Guide for Effectiveness and Comparative Effectiveness Reviews (http://www.effectivehealthcare.ahrq.gov/index.cfm/search-for-guides-reviews-and-reports/?pageaction=displayproduct&productid=328) and recently published in the Journal of Clinical Epidemiology.[13,14]

We considered the strength of the study designs with randomized controlled trials as the highest level of evidence, followed by comparative observational studies. Whenever an outcome was evaluated by at least one randomized controlled trial, and possibly observational studies, we graded the randomized controlled trial(s) and also the quality of the observational studies. If an outcome was evaluated by one or no randomized controlled trials, our evidence grade was based on the single randomized controlled trial in addition to the best available observational study.

We assessed the quality and consistency of the best available evidence, including assessments of the risk of bias in relevant studies, as well as aspects of consistency, directness, and precision as described in the Methods Guide for Effectiveness and Comparative Effectiveness Reviews and by Owens (2010).[14] The GRADE approach, upon which the Methods Guide Strength of Evidence grading is based, is meta-analytic centric and so we adapted the guidance for some of the domains. For instance, in GRADE, "precision" is defined in terms of summary estimates. Since we did not complete meta-analyses, we based this judgment on reviewing the precision (width of confidence intervals, other measures of variability) across the included studies. For each outcome of interest, two reviewers graded the major outcomes for each KQ, and then the entire team discussed their recommendations and reached consensus.

Data Synthesis

When we identified existing high-quality systematic reviews that addressed the KQs, we cited these reviews as evidence and did not abstract and synthesize data from the primary studies. For interventions (screening and diagnostic tests), comparisons, and outcomes that were not covered in systematic reviews and to update systematic reviews, we abstracted evidence from primary studies, including those that had been published or identified after the date of last search conducted for the systematic review. We followed the recommendations of Whitlock (2008) for incorporating systematic reviews in complex reviews and provided a narrative summary of the review methods (i.e., inclusion/exclusion criteria, search strategy, statistical methodology) and findings (i.e., number of studies included, quantitative and qualitative results). Similarly, in the instance of multiple reviews, we evaluated the consistency across reviews addressing the same key question.[15]

Results

The electronic search of MEDLINE AND CENTRAL identified 64 systematic review titles and abstracts (Figure 1). The Li 2010 database included 105 additional systematic review titles and abstracts (Figure 1). We excluded 167 of the 169 systematic review titles and abstracts for the following reasons: did not address any of the key questions, narrative summary only, could not retrieve full text to assess, similar inclusion criteria but date of search for studies older than another included systematic review on the same topic, and duplicate reference to an included systematic review. We identified two systematic reviews for inclusion.[7,16] One systematic review (Burr 2007)[7] addressed the diagnostic test accuracy of candidate screening tests for the detection of open-angle glaucoma (Key Question 3) and the second review (Hatt 2006)[16] addressed the question of whether screening-based programs prevent optic nerve damage due to open-angle glaucoma when compared to no screening (Key Question 5) (Evidence Tables 1 and 2 in Appendix C).

The electronic searches conducted for concurrent comparative effectiveness reviews of screening and treatment for OAG identified a total of 4960 primary study titles and abstracts. After removing duplicate citations, conference abstracts and book chapters (N = 1083), we reviewed 3877 titles and abstracts. We retrieved the full text of 652 articles and assessed the studies for inclusion in this review. We included 83 primary studies that addressed the diagnostic accuracy of candidate screening tests for the detection of OAG that were not included in the Burr 2007 systematic review (Key Question 3 - Evidence Tables 2 to 5 in Appendix C) because the investigators examined newer technologies or the manuscript was published after 6 December 2005 (See Figures 2a and 2b). We did not identify any primary studies eligible for inclusion for any other key question. A listing of the 558 excluded studies, with reason(s) for exclusion, is included in Appendix E.

A listing of devices from the primary studies is included in Appendix F. In summary the following number of diagnostic studies included the devices summarized in this comparative effectiveness review:

- Tests of optic nerve structure—
    - Cup to disc ratio measurement by examination (1 study)
    - Heidelberg retina tomograph (HRT) II (17 studies)
    - HRT III (11 studies)
    - Optic disc photography (2 studies)
    - Optical coherence tomography (OCT) (47 studies)
    - Retinal nerve fiber layer photography (2 studies)
    - Scanning laser polarimetry (GDx device) (27 studies)
- Tests of optic nerve function—
    - Frequency doubling technology (FDT) 24-2 perimetry (5 studies)
    - FDT 30-2 (2 studies)
    - FDT C-20 (4 studies)
    - FDT N30 (4 studies)
    - Goldmann applanation tonometry (2 studies)
    - Humphrey Visual Field Analyzer (HFA) (10 studies)
    - Non contact tonometry (1 study)
    - Octopus 301 perimeter (1 study)

Because there was appreciable variability in devices, parameters, thresholds, and measurement of outcomes reported in the primary studies of interest, we did not combine the

results using meta-analysis and instead present a narrative summary with particular emphasis on studies that identified early disease and/or examined newer and more frequently reported technologies. As we are unable to determine which parameters are most important for identifying persons with OAG, and as our reported results would have been limited to a few parameters in a subset of studies, we chose to include in the evidence tables (Appendix C) and discuss as appropriate the full complement of device parameters and thresholds as reported in the included studies. We summarize, where possible, the magnitude of validity across all parameters of interest for devices considered in this report.

Of the devices that were included in the Burr 2007 review, the following were also identified from the search of the literature conducted for this report: FDT, GAT, HFA, HRT II, non-contact tonometry, optic disc photography, and retinal nerve fiber layer photography. As there are differences in the eligibility criteria for the current report and the Burr 2007 review, including the devices, outcomes, and comparisons of interest, we chose not to undertake an update of the quantitative estimates of sensitivity and specificity from the Burr review for the devices that were common to both reviews.

This comparative effectiveness review also includes discussion of newer technologies including the and FDT 24-2, FDT 30-2, and FDT N-30, GDx, and HRT III.

Figure 2a. Summary of the literature search: Systematic reviews literature search

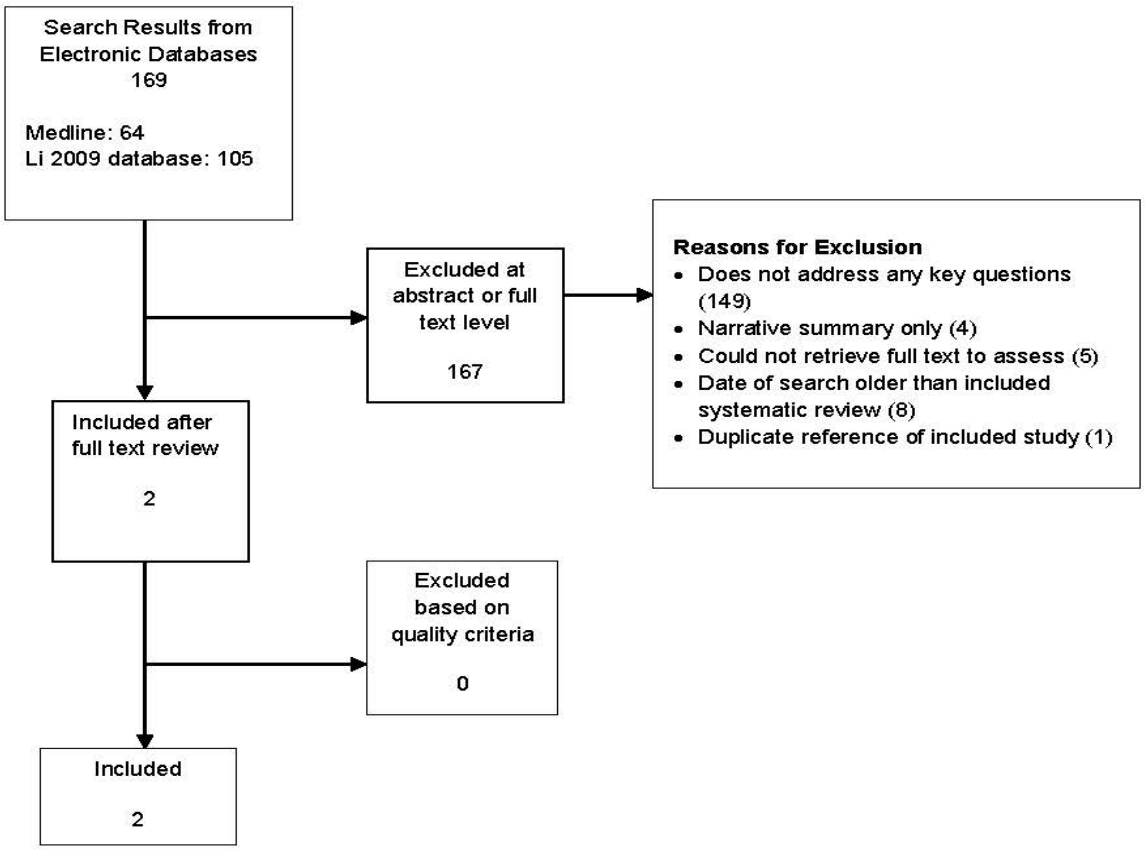
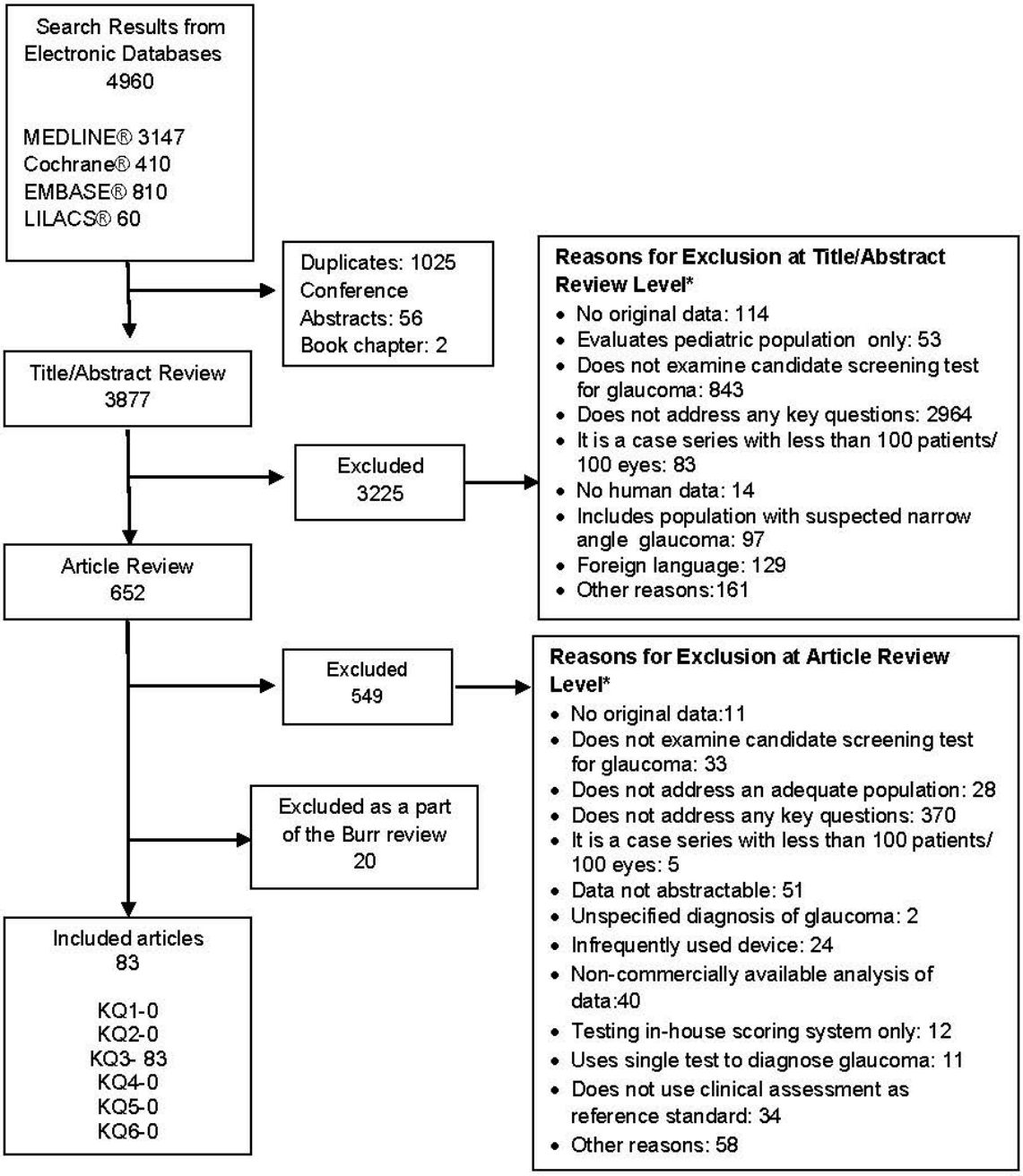


Figure 2b. Summary of the literature search: Primary studies literature search



* Total may exceed number in corresponding box, as articles excluded by two reviewers at this level.

Key Question 1

We did not identify any study that addressed whether participation in an OAG screening-based program leads to less visual impairment when compared to another screening-based program or no screening.

Key Question 2

We did not identify any study that addressed whether participation in an OAG screening-based program leads to improvements in patient-reported outcomes when compared to another screening-based program or no screening.

Key Question 3

Summary

Burr 2007 reviewed studies that compared standard automated perimetry (SAP) with several candidate tests.[6] Results indicated that the sensitivity of SAP was higher than Goldmann tonometry, similar to Heidelberg retina tomography (HRT), and lower than the evaluation of optic nerve head (optic disc) photographs or frequency doubling technology (FDT). Results also indicated that the specificity of SAP was higher than disc photographs and FDT, similar to HRT, and lower than Goldmann tonometry.

Despite improvements in technology, including newer imaging and functional technologies, it is still unclear whether any one test or combination of tests is suitable and sufficient for use in glaucoma screening.

The lack of a definitive diagnostic reference standard for glaucoma and the need for more homogeneity in the design and conduct of diagnostic test accuracy studies prevents a coherent synthesis of data and therefore limits conclusive statements regarding these tests.

Evidence From Systematic Reviews

Burr (2007) conducted a diagnostic test accuracy review of candidate diagnostic and screening tests for OAG.[6] Study inclusion criteria and pooled outcomes of sensitivity, specificity, and diagnostic odds ratios based on a common cut-off or threshold are listed in the evidence table (Evidence Table 1 in Appendix C). In summary, the investigators included 40 studies totaling more than 48000 participants 40 years of age and older and those at high risk for the development of OAG based on demographic characteristics or comorbidities. The focus was on studies of participants likely to be encountered in a routine screening setting. Tests of optic nerve structure, optic nerve function, and intraocular pressure were included and compared to other individual or combination tests. The primary reference standard was confirmation of OAG at follow-up examination. Also considered was diagnosis of OAG requiring treatment. Prespecified outcomes were measures related to sensitivity, specificity, harms, acceptability and reliability. There was significant statistical heterogeneity among the included studies for the majority of the tests, with the exception of FDT C-20-1 (sensitivity), HRT II (sensitivity and specificity), and optic disc photography (sensitivity). The authors also note that there were no studies that were at low risk of bias for all of the modified QUADAS domains examined. A small subset of eight studies was judged to have higher quality as the study investigators enrolled participants who were representative of a screening/diagnostic setting (low risk of spectrum bias). As well these studies were at low risk of verification bias (both partial and differential) and test and diagnostic review bias.

We include a narrative summary of the devices and tests included in this review with corresponding pooled estimates of sensitivity and specificity (Table 1). Summary sensitivity and specificity and diagnostic odds ratio (DOR) estimates were reported “as median and 95%

credible interval (CrI). Credible intervals are the Bayesian equivalent of confidence intervals."[7] (A listing of devices is included in Appendix F.)

Table 1. Summary of Burr 2007 systematic review

Tests of Optic Nerve Structure	Number of Studies	Common Cutoff Point	Pooled Sensitivity	Pooled Specificity
Heidelberg Retina Tomograph (HRT) II	3	1 borderline or outside normal limits or Global or 1 of 6 segments flagged abnormal	86%	89%
Ophthalmoscopy	7	Vertical cup-to-disc ratio ≥ 0.7	60%	94%
Optic disc photography	6	Cup-to-disc ratio ≥ 0.59	73%	89%
Retinal Nerve Fiber Layer (RNFL) photography	4	Diffuse and/or localized defect	75%	88%
FDT (C-20-1) Perimetry	3	One abnormal test point	92%	94%
FDT (C-20-5) Perimetry	5	One abnormal test point	78%	75%
Goldmann applanation Tonometry	9	IOP ≥ 20.5-22 mmHg	46%	95%
Noncontact tonometry	1	IOP ≥ 21 mmHg	92%	92%
Oculokinetic Perimetry	4	One or more points missing	86%	90%
SAP Suprathreshold Test	9	Various thresholds selected	71%	85%
SAP Threshold Test	5	Various threshold selected	88%	80%

FDT = frequency doubling technology; IOP = intraocular pressure; SAP = standard automated perimetry

Tests of Optic Nerve Structure

Heidelberg Retina Tomograph (HRT) II

HRT II was a diagnostic test of interest in three studies, all with a common cutoff point and two of which were judged to be of higher quality than the third. One study specifically recruited high-risk populations (family history of OAG, African or Caribbean descent, aged 50 years or older). Using the common criterion of one or more results that are borderline or outside normal limits, the pooled sensitivity was 86 percent (95% CrI, 55 to 97%) and the pooled specificity was 89 percent (95% CrI, 66 to 98%).

Ophthalmoscopy

Burr (2007) included seven studies addressing the diagnostic accuracy of ophthalmoscopy including slit-lamp biomicroscopy (two studies) and direct ophthalmoscopy (five studies).[6] Using a common cut-off point of a vertical cup-to-disc ratio greater than or equal to 0.7 (also defined as gradings of "normal" and "suspicious" or other subjective criteria as defined by consultant ophthalmologists), pooled sensitivity and specificity for the five studies with common criterion were 60 percent (95% CrI, 34 to 82%) and 94 percent (95% CrI, 76 to 99%), respectively. The diagnostic odds ratio was 25.7 (95% CrI, 5.79 to 109.50) suggesting a 26-fold higher odds of a positive test among those with glaucoma when compared to those without glaucoma.

Optic Disc Photography

There were six studies of optic disc photography with five using a common criterion of a vertical cup-to-disc ratio greater than 0.59 to greater than or equal to 0.7. The range of sensitivity was 65 to 77 percent and the range of specificity was 59 to 98 percent. The authors noted that

some photographs were taken with pupils dilated (three of six studies) while the remaining did not specify whether dilation was used.

Retinal Nerve Fiber Layer (RNFL) Photography

The common cut-off point for the four included studies was diffuse and/or localized defect observed on RNFL photographs. Among these studies, two were described as including participants "representative of a screening or diagnostic setting." The pooled diagnostic odds ratio was 23.1 (95% CrI, 4.41 to 123.50), and the pooled sensitivity and specificity were 75 and 88 percent, respectively.

Tests of Optic Nerve Function

FDT (C-20-1) Perimetry

Three studies of FDT (C-20-1) were considered, all of which used the common diagnostic criterion of one abnormal test point. The pooled sensitivity and specificity results for this test were high (92 and 94% respectively).

FDT (C-20-5) Perimetry

Five studies of FDT (C-20-5) with significant heterogeneity were included using the common cut-off point of one abnormal test point. The range of sensitivity was 7 to 100 percent; the specificity range was 55 to 89 percent.

Goldmann Applanation Tonometry (GAT)

At the common cut-off point of intraocular pressure greater than 20.5-22 mm Hg, nine studies with significant heterogeneity reported sensitivity in the range of 10 to 90 percent and specificity in the range of 81 to 99 percent.

Noncontact Tonometry

One study with an inappropriate reference standard reported a sensitivity of 92 percent and specificity of 92 percent using of the criterion of intraocular pressure greater than 21 mm Hg.

Oculokinetic Perimetry

Four studies were included that examined the diagnostic accuracy of oculokinetic perimetry. Three were studies of participants who may be encountered in a screening setting; one was judged to be of higher quality (based on modified QUADAS domains). The common criterion varied in description, but is best described as one or more points missing. The odds of a positive test were 57 times higher (DOR, 57.54) for those with glaucoma when compared to those without glaucoma (95% CrI, 4.42 to 1585.00). The pooled sensitivity and specificity were 86 and 90 percent respectively.

SAP Suprathreshold Test

Nine studies, including the Baltimore Eye Survey and the Blue Mountains Eye Study, were included in the analysis. Although the sensitivity and specificity were similar among the Baltimore and Blue Mountains studies, there was significant heterogeneity among the included studies. The range in sensitivity was 25 to 90 percent; the range in specificity was 67 to 96 percent.

SAP Threshold Test

Among the five studies analyzed for SAP threshold both Humphrey 30-2, 24-2 threshold, and Octopus 500 were evaluated. The pooled sensitivity was 88 percent and specificity was 80 percent for the common cutoff point (the definition of the common cut-off point differed by included study, but is defined in Burr (2007).

Direct Comparisons of Candidate Tests

Six studies included comparisons of standard automated perimetry (SAP) to optic disc photography, HRT II, FDT, and/or Goldmann applanation tonometry. Burr 2007 concluded that sensitivity results at the common cut-off point for each test revealed that SAP performed better than Goldmann applanation tonometry. One of the two studies that addressed the comparison of SAP to Goldmann applanation tonometry (GAT) reported estimates of sensitivity of 89 percent and 3-14 percent respectively. Specificity values were 73 percent for SAP and 98-99 percent for Goldmann applanation tonometry. Burr 2007 also concluded that SAP was similar to HRT II. The sensitivity of SAP and HRT II was 72 percent and 69 percent respectively in one of the two included studies; the specificity for both tests was 95 percent. There was one included study in which the investigators compared SAP to optic disc photography. Optic disc photographs had a similar sensitivity (73 to 77 percent) and specificity (59 to 62 percent) with SAP (sensitivity 50 to 71 percent; specificity 58 to 83 percent). In the two studies that included comparisons of SAP to frequency doubling technology (FDT), one study reported similar sensitivity estimates (SAP 63 to 90 percent; FDT C-20-5 68 to 84 percent) and similar specificity values (SAP 58 to 74 percent; FDT C-20-5 55 to 76 percent).

Based on analyses of the common criterion for each test, test accuracy, combination tests, tests for glaucoma at specific stages, and direct and indirect comparisons of tests, Burr (2007) concluded that optic disc photography, HRT II, FDT, SAP and Goldmann applanation tonometry were candidates for use in a screening-based program.

Detailed Analysis of Primary Studies

We undertook a search for additional primary studies, as described in the Methods section to address the diagnostic accuracy of candidate screening tests, and identified 83 studies.

With respect to the risk of bias of included primary studies, 68 percent of the included studies were at high risk of spectrum bias as the study investigators enrolled participants who were not representative of those who would receive the test in practice, i.e., healthy volunteers compared to participants with known glaucoma. Six percent of the studies were at high risk of differential verification bias because the study investigators applied a different reference standard to a subset of participants enrolled in the study. A low percentage (2%) were at high risk of incorporation bias, but due to the lack of detail in the descriptions of the reference standard, it was unclear whether the reference standard and candidate tests were independent of each other in 12 percent of the included studies.

With respect to masking of study personnel interpreting the results of the reference standard and candidate tests, the candidate test(s) was/were interpreted without knowledge of the reference standard result in 29 percent of the included studies and the reference test interpreted without knowledge of the candidate test(s) in 44 percent of included studies, but we judged these domains to be unclear in 54 percent and 48 percent of the included studies respectively. Forty-

eight percent (48%) of the studies did not include an explanation for withdrawals from the study, while 46 percent of the studies reported the number of uninterpretable test results.

The judgments for the 13 QUADAS risk of bias domains as well as sensitivity, specificity, and/or area under the ROC curve (AUS) results by device/test parameter, are summarized in the evidence tables (Appendix C).

A narrative summary of the results follows with a particular emphasis on studies that identified early disease, and/or examined newer and more frequently reported technologies.

Tests of Optic Nerve Structure

HRT II

Seventeen studies included measures of diagnostic accuracy for HRT II (Table 2).[17-33] Naithani (2007)[25] and Uysal (2007)[27] which specifically focused on detecting early or moderate glaucoma, are discussed in this narrative section. The populations, devices and reference standards for all studies including the remaining 15 studies are summarized in the table above and the estimates of diagnostic accuracy are detailed in the evidence tables (Appendix C).

Naithani (2007) enrolled 60 participants with glaucoma (30 early defects and 30 moderate visual field defects) and 60 healthy volunteers.[25] Area under the receiver operating characteristic curve (AUC values) were reported to be in the range of 0.474 (disc area ratio parameter) to 0.852 (vertical cup-to-disc ratio parameter).

Uysal (2007) enrolled 70 participants with early or moderate glaucoma and 70 healthy volunteers.[27] The range of sensitivity across 12 parameters was 47.1 percent (RNFL cross-sectional area) to 74.3 percent (linear cup/disc area ratio) and the range of specificity was 47.1 percent (mean RNFL thickness) to 71.4 percent (cup shape measure). The investigators concluded that some parameters have better sensitivity and specificity than others including cup/disc area ratio, linear cup/disc area ratio, and mean cup depth. In addition, subgroup analysis by disc size revealed that it was more difficult to distinguish glaucoma in participants with smaller discs.

The remaining 15 studies explored comparisons of HRT II with other devices such as the GDx VCC, OCT, HRT III, and FDT. Overall, HRT II was found not to perform as well as GDx VCC, OCT, and FDT. HRT II and HRT III were found to have a similar diagnostic profile. Three of the included studies concluded that HRT II was not an appropriate tool for population-based glaucoma screening studies.

Table 2. Characteristics of included HRT II studies

Study	Populations	Devices	Reference Standard
Burgansky-Eliash[28] 2007	Healthy Controls (IOP ≤21) Glaucoma (IOP ≥22)	HRT II, HRT III	Clinical exam, visual field testing
Danesh-Meyer[33] 2006	Healthy Controls Suspects (IOP 22-30) Glaucoma	HFA SITA-Standard, HRT II, Optic disc photographs	Expert diagnosis
De Leon-Ortega[24] 2007	Healthy Controls (IOP <22) Glaucoma	HRT II, HRT III	Clinical exam
Ferreras[32] 2007	Healthy Controls (IOP <20) Preperimetric Glaucoma Glaucoma (IOP >21)	GDx VCC, Stratus OCT, HRT II	Visual field testing, Optic nerve assessment, IOP measurement
Ferreras[23] 2008	Healthy Controls (IOP ≤21) Glaucoma (IOP ≥22)	HRT II, HRT III	Clinical exam, Visual field testing

Table 2. Characteristics of included HRT II studies (continued)

Study	Populations	Devices	Reference Standard
Healey[17] 2010	Population-based sample	HRT II	Visual field testing, Disc photographs
Medeiros[31] 2004	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, HRT II, Stratus OCT	Clinical exam, Visual field testing
Medeiros[30] 2006	Healthy Controls (IOP ≤21) Glaucoma	GDX-VCC, HRT II, Stratus OCT	Visual field testing
Medeiros [22] 2008	Healthy Controls Glaucoma	HRT II, GDx-VCC	Clinical exam, Visual field testing, Disc photographs
Naithani[25] 2007	Healthy Controls (IOP ≤21) Suspects IOP (>21) Glaucoma (IOP >21)	HRT II, Stratus OCT	Clinical exam, Visual field testing
Pueyo [26] 2007	Healthy Controls (IOP ≤21) Glaucoma (IOP ≥22)	HRT II, Stratus OCT, GDx-VCC	Clinical exam, Visual field testing, Disc photographs
Pueyo[18] 2009	Healthy Controls (IOP≤21) OHT patients (>21)	HRT II, Stratus OCT, FDT C20, HFA SWAP-FT, GDx-VCC	Clinical exam
Saito [21] 2009	Population-based sample	HRT II	Clinical exam, Visual field testing, Optic nerve assessment
Shah[29] 2006	Healthy Controls Glaucoma	GDx-VCC, HRT II, Stratus OCT	Clinical exam, Visual field testing
Uysal [27] 2007	Healthy Controls Early/moderate glaucoma	HRT II	Visual field testing, Optic nerve assessment
Zeppieri[20] 2010	Healthy Controls (≤21) OHT patients (IOP >21) Glaucoma (>21)	FDT N30, GDx-VCC, HRT II	Clinical exam, Visual field testing
Zheng[19] 2010	Healthy Controls Suspects (IOP <21) Glaucoma	HRT II	Clinical exam

FDT = frequency doubling technology; FT = full threshold; GDx = glaucoma diagnosis; HFA = Humphrey field analyzer; HRT = Heidelberg retina tomography; IOP = intraocular pressure; OCT = optical coherence tomography; SITA = Swedish interactive threshold algorithm; SWAP = short wavelength automated perimetry; VCC = variable corneal compensation

HRT III

Eleven studies examined the diagnostic accuracy of HRT III (Table 3).[23,24,28,34-41] Reddy (2009) identified 81 participants with early visual field loss (out of 247 participants with glaucoma) and 142 healthy volunteers. Early visual field loss was defined as a mean deviation less than 5dB[36]. The sensitivity of the Glaucoma Probability Score for distinguishing eyes with early field loss from healthy eyes was 67.9 percent and the Moorfields Regression Analysis was 71.9 (at a fixed specificity of 92%). The investigators concluded that, "Moorfields Regression Analysis and Glaucoma Probability Score have similar ability to detect glaucomatous changes, and typically agree. The relative ease and sensitivity of the operator-independent Glaucoma Probability Score function of the HRT III may facilitate glaucoma screening."

Badala (2007) compared four imaging methods for their ability to distinguish early glaucoma from healthy eyes.[40] Forty-six eyes from 46 participants with early OAG and 46 eyes from healthy volunteers were enrolled. Sensitivity (parameter: reference height) ranged from 4 to 70 percent (Frederick S. Mikelberg discriminant function and Reinhard O. W. Burk discriminant function) when holding the specificity of the test constant at 95 percent.

Table 3. Characteristics of included HRT III studies

Study	Populations	Devices	Reference Standard
Badala[40] 2007	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, HRT III, Stratus OCT	Clinical exam, Visual field testing
Bozkurt[35] 2010	Healthy Controls (IOP≤21) Suspects Glaucoma (IOP ≥23)	HRT III	Clinical exam, Visual field testing
Burgansky-Elias[28] 2007	Healthy Controls (IOP≤21) Glaucoma (IOP ≥22)	HRT II, HRT III	Clinical exam, Visual field testing
De Leon-Ortega[24] 2007	Healthy Controls (IOP<22) Glaucoma	HRT II, HRT III	Clinical exam
Ferreras[41] 2007	Healthy Controls (IOP <20) Glaucoma (IOP >21)	HRT III	Visual field testing, IOP measurement
Ferreras[23] 2008	Healthy Controls (IOP≤21) Glaucoma (IOP ≥22)	HRT II, HRT III	Clinical exam, Visual field testing
Moreno-Montanes[39] 2008	Healthy Controls (IOP≤21) OHT patients (IOP>21) Glaucoma	HRT III	Clinical exam, Visual field testing
Moreno-Montanes[34] 2009	Healthy Controls (IOP≤21) Suspects (IOP >21) Glaucoma	HRT III, Stratus OCT	Clinical exam, Visual field testing, IOP measurement
Oddone[37] 2009	Healthy Controls (IOP<22) Glaucoma (IOP >24)	HRT III	Visual field testing, IOP measurement
Reddy[36] 2009	Healthy Controls (IOP<22) Glaucoma	HRT III	Visual field testing, Optic nerve assessment
Takmaz[38] 2009	Healthy Controls (IOP≤21) Glaucoma (IOP >21)	HRT III	Clinical exam

GDx = glaucoma diagnosis; HRT = Heidelberg retina tomography; IOP = intraocular pressure; OCT = optical coherence tomography; VCC = variable corneal compensation

Optical Coherence Tomography (OCT)

Of the 48 included studies that investigated the diagnostic accuracy of OCT, [18,25,26,29-32,34,40,42-79,83] 34 considered the Stratus OCT, 10 included the Cirrus OCT, six considered the RTVue OCT, 2 included Spectralis OCT, two examined the OTI OCT and one included the OTI Spectral OCT/SLO (Table 4). Across the 34 studies that examined the Stratus OCT, all were at high risk of spectrum bias because those with known disease along with healthy eyes were enrolled in the studies. The sample size ranged from 26 to 95 participants with glaucoma or suspected glaucoma and 37 to 128 healthy volunteers with one study also enrolling 130 participants with ocular hypertension. For the parameter average RNFL thickness, the range of sensitivity was 24 to 96 percent, suggesting appreciable heterogeneity among the studies. The range of the specificity was 66 to 100 percent. The evidence table for this report (Appendix C) includes diagnostic test accuracy outcomes for more than 25 additional parameters.

Table 4. Characteristics of included OCT studies

Study	Populations	Devices	Reference Standard
Aptel [78] 2010	Healthy Controls Suspects OAG	Cirrus OCT, Stratus OCT, GDx-VCC	Clinical exam, Visual field testing, Optic disc photographs
Badala[40] 2007	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, HRT III, Stratus OCT	Clinical exam, Visual field testing
Bagga [64] 2006	Healthy Controls (IOP ≤21) Glaucoma	FDT 24-2, GDx-VCC, Goldmann tonometer, HFA SWAP-FT, Stratus OCT	Optic nerve assessment

Table 4. Characteristics of included OCT studies (continued)

Study	Populations	Devices	Reference Standard
Benitez del Castillo[77] 2011	Healthy Controls OAG	Cirrus OCT, GDx-VCC, GDx-ECC	Clinical exam, Visual field testing
Brusini[60] 2006	Healthy Controls (IOP ≤21) Glaucoma (IOP >21)	GDx-VCC, Stratus OCT	Clinical exam, Visual field testing
Brusini[61] 2006	Healthy Controls (IOP ≤21) Glaucoma (IOP >21)	GDx-VCC, Stratus OCT	Clinical exam, Visual field testing
Chang[50] 2009	Healthy Controls (IOP ≤21) Glaucoma	Cirrus OCT, Stratus OCT	Clinical exam
Chen[63] 2005	Healthy Controls (IOP ≤20) Glaucoma (IOP ≥22)	Stratus OCT	Clinical exam, Visual field testing, Optic nerve assessment
Cho[79] 2011	Healthy Controls POAG	OTI OCT, Stratus OCT	Clinical exam, Visual field testing
Fang[43] 2010	Healthy Controls (IOP ≤21) Glaucoma	RTVue OCT	Clinical exam
Ferreras[32] 2007	Healthy Controls (IOP <20) Preperimetric Glaucoma Glaucoma (IOP >21)	GDx VCC, Stratus OCT, HRT II	Visual field testing, Optic nerve assessment, IOP measurement
Girkin[72] 2011	Healthy Controls POAG	Cirrus OCT	Clinical exam, Visual field testing
Hong[83] 2007b	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, FDT 30-2, Stratus OCT, RNFL Photographs	Clinical exam, Visual field testing
Horn [75] 2011	Healthy Controls Preperimetric OAG	Spectralis OCT	Clinical exam, Visual field testing, Optic disc photographs
Kim [70] 2011	Healthy Controls NTG POAG	RTVue OCT	Clinical exam, Visual field testing
Leite[73] 2011	Healthy Controls OHT POAG	Cirrus OCT- RTVue OCT- Spectralis OCT	Visual field testing, Optic nerve assessment
Leite[47] 2010	Healthy Controls (IOP ≤22) Glaucoma	Cirrus OCT	Visual field testing, Optic nerve assessment
Leung[89] 2005	Healthy Controls (IOP ≤21) OHT patients (IOP 22-30) Glaucoma patients	Stratus OCT	Clinical exam, Visual field testing
Leung[68] 2004	Healthy Controls (IOP ≤21) Suspects (IOP >21) Glaucoma	Stratus OCT	Clinical exam, Visual field testing
Li[48] 2010	Healthy Controls Suspects Glaucoma	Stratus OCT	Clinical exam
Lu[56] 2008	Healthy Controls (IOP ≤21) Glaucoma (IOP >21)	Stratus OCT	Visual field testing, Disc photographs
Mansoori[42] 2010	Healthy Controls (IOP ≤21) Suspects (IOP 24-32) Glaucoma (IOP ≥22)	OTI OCT	Clinical exam, Visual field testing, IOP measurement
Mansoori [74] 2010	Healthy Controls NTG POAG	OTI Spectral OCT/SLO	Visual field testing, Optic nerve assessment, IOP measurement
Medeiros[30] 2006	Healthy Controls (IOP ≤21) Glaucoma	GDX-VCC, HRT II, Stratus OCT	Visual field testing
Medeiros[66] 2005	Healthy Controls (IOP ≤21) Glaucoma	Stratus OCT	Clinical exam
Medeiros[31] 2004	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, HRT II, Stratus OCT	Clinical exam, Visual field testing

Table 4. Characteristics of included OCT studies (continued)

Study	Populations	Devices	Reference Standard
Moreno-Montanes[51] 2010	Healthy Controls (IOP ≤21) Glaucoma (IOP ≥22)	Cirrus OCT, Stratus OCT	Clinical exam , Visual field testing
Moreno-Montanes[34] 2009	Healthy Controls (IOP ≤21) Suspects (IOP >21) Glaucoma	HRT III, Stratus OCT	Clinical exam, Visual field testing, IOP measurement
Mori[69] 2010	Healthy Controls (≤21) Suspects Glaucoma	Stratus OCT	Visual field testing, Optic nerve assessment
Naithani[25] 2007	Healthy Controls (IOP ≤21) Suspects (IOP >21) Glaucoma (IOP >21)	HRT II, Stratus OCT	Clinical exam, Visual field testing
Nouri-Mahdavj[57] 2008	Healthy Controls (IOP ≤22) Early glaucoma by disc (IOP >22) Early glaucoma by visual field (IOP >22)	Stratus OCT	Clinical exam
Oddone[71] 2011	Healthy Controls POAG	Cirrus OCT- GDx-VCC	Clinical exam, Visual field testing
Pablo[45] 2010	OHT without RNFL defects (IOP ≥22) OHT with RNFL defects (IOP ≥22)	GDx-VCC, Stratus OCT	Optic disc photos
Park[49] 2009	Healthy Controls (IOP ≤21) Glaucoma	Cirrus OCT, Stratus OCT	Clinical exam
Polo[55] 2009	Healthy Controls (IOP <21) Glaucoma (IOP >20)	Stratus OCT	Clinical exam, Visual field testing
Pueyo[18] 2009	Healthy Controls (IOP ≤21) OHT patients (IOP >21)	HRT II, Stratus OCT, FDT C20, HFA SWAP-FT, GDx-VCC	Clinical exam
Pueyo[26] 2007	Healthy Controls (IOP ≤21) Glaucoma (IOP ≥22)	HRT II, Stratus OCT, GDx-VCC	Clinical exam, Visual field testing, Disc photographs
Rao[46] 2010	Healthy Controls (IOP ≤21) Glaucoma	RTVue OCT	Clinical exam
Sehi[52] 2009	Healthy Controls (IOP ≤21) Glaucoma	RTVue OCT, Stratus OCT	Clinical exam ,Visual field testing, Optic nerve assessment
Sehi [59] 2007	Healthy Controls (IOP ≤21) Glaucoma	GDx-ECC, GDx-VCC, Stratus OCT	Clinical exam, Visual field testing
Shah[29] 2006	Healthy Controls Glaucoma	GDx-VCC, HRT II, Stratus OCT	Clinical exam, Visual field testing
Shoji[76] 2011	Healthy Controls High myopia with glaucoma	RTVue OCT	Clinical exam, Visual field testing
Sihota[62] 2006	Healthy Controls (IOP ≤21) Glaucoma (IOP ≥22)	Stratus OCT	Clinical exam, Visual field testing
Sung[54] 2009	Healthy Controls (IOP ≤21) Suspects (IOP >21) Glaucoma	Cirrus OCT, Stratus OCT	Clinical exam ,Visual field testing, Disc photographs
Takahashi[58] 2008	Healthy Controls Suspects Glaucoma	GDx-VCC, Stratus OCT	Visual field testing, Optic nerve assessment
Wollstein[67] 2005	Healthy Controls Glaucoma	Stratus OCT	Clinical exam, Visual field testing

Table 4. Characteristics of included OCT studies (continued)

Study	Populations	Devices	Reference Standard
Yuksel[53] 2009	Healthy Controls (IOP ≤21) Glaucoma	Stratus OCT	Visual field testing
Zhong[44] 2010	Healthy Controls(IOP ≤21) Normal Tension Glaucoma (IOP ≤21)	Stratus OCT, HFA SWAP	Clinical exam, Visual field testing, IOP measurement

FDT = frequency doubling technology; FT = full threshold; GDx = glaucoma diagnosis; HFA = Humphrey field analyzer; HRT = Heidelberg retina tomography; IOP = intraocular pressure; OCT = optical coherence tomography; RNFL = retinal nerve fiber layer; SLO = scanning laser ophthalmoscope; SWAP = short wavelength automated perimetry; VCC = variable corneal compensation

Optic Disc Photography

We included two studies of the diagnostic accuracy of optic disc photography[33,80] and one study of cup to disc ratio measurement as measured by an ophthalmologist using a slit lamp biomicroscope and 78 Diopter lens (Table 5).[81] Danesh-Meyer (2006) included participants with OAG (n=42), as well as glaucoma suspects (n=23) and healthy volunteers (n=45).[33] Investigators took optic disc photographs using the Canon CF60U camera, 30-degree setting, with Kodak Ektachrome EPR 150 film and graded by two investigators. Two investigators determined the Disc Damage Likelihood Score by using a Nikon 60 diopter fundus lens with a slit-lamp. The AUC (comparison of those deemed to have glaucoma and borderline disease versus normal) was 0.84 (95% CI, 0.74 to 0.92) for the cup-to-disc ratio and 0.95 (95% CI, 0.80 to 0.98) for Disc Damage Likelihood Score suggesting that the Disc Damage Likelihood Score is a more effective means of discriminating people with and without disease. The diagnostic accuracy of cup to disc ratio measurement from the Francis (2011) study is described in the section on FDT C-20 perimetry.

Table 5. Characteristics of included optic disc photography studies

Study	Populations	Devices	Reference Standard
Danesh-Meyer [33] 2006	Healthy Controls Suspects (IOP 22-30) Glaucoma	HFA SITA-Standard, HRT II, Optic disc photographs	Clinical exam
Francis[81] 2011	Population-based sample	FDT C20, HFA SITA 24-2, Goldman tonometer, Cup to disc measurement via ophthalmologist examination	Clinical exam, Visual field testing, Disc photographs
Reus[80] 2010	Healthy Controls (≤21) OHT pts (IOP 22-32) Glaucoma (IOP 22-32)	Disc photographs, GDx-VCC	Clinical exam

FDT = frequency doubling technology; FT = full threshold; GDx = glaucoma diagnosis; HFA = Humphrey field analyzer; HRT = Heidelberg retina tomography; IOP = intraocular pressure; OHT = ocular hypertension; VCC = variable corneal compensation

Scanning Laser Polarimetry (GDx)

Twenty-seven studies included an investigation of the GDx with variable corneal compensation (VCC) (Table 6).[18,20,22,26,29-32,40,45,58,59,61,64,71,77,78,80,82-90] The aim of eight studies was to discriminate early glaucoma from no disease.[18,20,40,45,83,85,88] In the studies that focused on early OAG, the range of sensitivity across all comparisons and cut-offs for the most frequently reported parameter, Temporal, Superior, Nasal, Inferior, Temporal average, was 29.8 to 81.63 percent. Specificity was fixed at 80, 90, or 95 percent in three studies, and the lowest reported

specificity was 66.36 percent. The range in sensitivity for the nerve fiber indicator parameter across all comparisons and cut-offs was 28.3 to 93.3 percent. Specificities ranged from 52.9 percent to a fixed cut off of 80, 90, and 95 percent.

Three studies examined the GDx with enhanced corneal compensation (ECC)[59,86,87] The sample sizes of the included studies ranged from 63 to 92 glaucoma participants and 41 to 95 healthy volunteers. Medeiros (2007) compared the AUCs for GDx with variable corneal compensation and GDx with enhanced corneal compensation and reported that GDx with enhanced corneal compensation performed significantly better than GDx with variable corneal compensation for the parameters Temporal, Superior, Nasal, Inferior, Temporal average, Superior average, and Inferior average (p =<0.01).[86] Sehi (2007)[59] and Mai (2007)[87] concurred with Medeiros (2007) that imaging with enhanced corneal compensation appears to improve the ability to diagnose OAG.

Table 6. Characteristics of included scanning laser polarimetry studies

Study	Populations	Devices	Reference Standard
Aptel[78] 2010	Healthy Controls Suspects OAG	Cirrus OCT, Stratus OCT, GDx-VCC	Clinical exam, Visual field testing, Optic disc photographs
Badala[40] 2007	Healthy Controls (≤21) Glaucoma	GDx-VCC, HRT III, Stratus OCT	Clinical exam, Visual field testing
Bagga[64] 2006	Healthy Controls (IOP ≤21) Glaucoma	FDT 24-2, GDx-VCC, Goldmann tonometer, HFA SWAP-FT, Stratus OCT	Optic nerve assessment
Benitez del Castillo[77] 2011	Healthy Controls OAG	Cirrus OCT, GDx-VCC, GDx-ECC	Clinical exam, Visual field testing
Brusini[60] 2006	Healthy Controls (IOP ≤21) Glaucoma (IOP >21)	GDx-VCC, Stratus OCT	Clinical exam, Visual field testing
Chen[84] 2008	Healthy Controls (IOP ≤21) POAG (IOP ≥22)	GDx-VCC	Clinical exam, Visual field testing, Optic nerve assessment, IOP measurement
Da Pozzos[89] 2005	Healthy Controls (IOP ≤21) OHT patients (IOP 21-30) Glaucoma	GDx-VCC	Clinical exam, Visual field testing
Ferreras[32] 2007	Healthy Controls (IOP <20) Preperimetric Glaucoma Glaucoma (IOP >21)	GDx VCC, Stratus OCT, HRT II	Visual field testing, Optic nerve assessment, IOP measurement
Hong[83] 2007b	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, FDT 30-2, Stratus OCT, RNFL photographs	Clinical exam, Visual field testing
Kanamori[88] 2006	Healthy Controls (IOP ≤21) Suspects OHT patients (IOP >21) Early glaucoma	GDx-VCC	Clinical exam
Mai[87] 2007	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, GDx-ECC	Clinical exam, Visual field testing
Medeiros [22] 2008	Healthy Controls Glaucoma	HRT II, GDx-VCC	Clinical exam, Visual field testing, Optic disc photographs
Medeiros[86] 2007	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, GDx-ECC	Clinical exam, Visual field testing
Medeiros[30] 2006	Healthy Controls (IOP ≤21) Glaucoma	GDX-VCC	Visual field testing
Medeiros[31] 2004	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, HRT II, Stratus OCT	Clinical exam, Visual field testing

Table 6. Characteristics of included scanning laser polarimetry studies (continued)

Study	Populations	Devices	Reference Standard
Medeiros[82] 2004	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, HRT II, Stratus OCT	Clinical exam
Oddone [71] 2011	Healthy Controls POAG	Cirrus OCT- GDx-VCC	Clinical exam, Visual field testing
Pablo[45] 2010	OHT without RNFL defects (IOP ≥22) OHT with RNFL defects (IOP ≥22)	GDx-VCC, Stratus OCT	Optic disc photographs
Parikh[85] 2008	Healthy Controls (IOP ≤21) Glaucoma (IOP ≥22)	GDx-VCC	Clinical exam, Visual field testing
Pueyo[18] 2009	Healthy Controls (IOP≤21) OHT patients (IOP >21)	HRT II, Stratus OCT, FDT C20, HFA SWAP-FT, GDx-VCC	Clinical exam
Pueyo [26] 2007	Healthy Controls (IOP ≤21) Glaucoma (IOP ≥22)	HRT II, Stratus OCT, GDx-VCC	Clinical exam, Visual field testing, Optic disc photographs
Reus[80] 2010	Healthy Controls (IOP ≤21) OHT pts (IOP 22-32) Glaucoma (IOP 22-32)	Disc photographs, GDx-VCC	Clinical exam
Reus[90] 2004	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, HFA SITA-Standard	Clinical exam, Visual field testing
Sehi[59] 2007	Healthy Controls (IOP ≤21) Glaucoma	GDx-ECC, GDx-VCC, Stratus OCT	Clinical exam, Visual field testing
Shah[29] 2006	Healthy Controls Glaucoma	GDx-VCC, HRT II, Stratus OCT	Clinical exam, Visual field testing
Takahashi[58] 2008	Healthy Controls Suspects Glaucoma	GDx-VCC, HRT II	Visual field testing, Optic nerve assessment
Zeppieri[20] 2010	Healthy Controls (IOP ≤21) OHT patients (IOP >21) Glaucoma (IOP >21)	FDT N30, GDx-VCC, HRT II	Clinical exam, Visual field testing

FDT = frequency doubling technology; FT = full threshold; GDx = glaucoma diagnosis; HFA = Humphrey field analyzer; HRT = Heidelberg retina tomography; IOP = intraocular pressure; OAG = open-angle glaucoma; OCT = optical coherence tomography; OHT = ocular hypertension; POAG = primary open-angle glaucoma; SITA = Swedish interactive threshold algorithm; SWAP = short wavelength automated perimetry; VCC = variable corneal compensation

RNFL Photography

Two studies examined the accuracy of retinal nerve fiber layer (RNFL) photography (Table 7).[82,83] Hong (2007b) analyzed RNFL photographs of 72 glaucoma and 48 healthy participants taken with the Heidelberg retina angiograph 1.[83] Two investigators, unaware of the participant's diagnosis, reviewed the photographs. A third investigator served as an adjudicator to resolve any disagreements. Results showed the RNFL defect score II, with an AUC of 0.75 ($p < 0.001$), was the best parameter for discriminating early glaucoma and healthy eyes (sensitivity 58.3% and specificity 95.8%).

Medeiros (2004) compared RNFL photography to the GDx with variable corneal compensation in 42 participants with OAG, 32 OAG suspects, and 40 healthy volunteers.[82] Investigators photographed one eye of each participant using the Topcon TRC-50VT camera and Kodak Kodalith high-contrast film (red-free filter). Two investigators used a set of 25 reference photos to score photographs and a third investigator adjudicated disagreements. The sensitivities of the global RNFL score were 36 and 81 percent respectively for fixed specificities of 95 and 80 percent. At a fixed specificity of 95 percent, the sensitivity of the Nerve Fiber Indicator was 71 percent versus the 36 percent reported above for red-free photos. Overall, the global RNFL score

determined from red-free photos did not perform as well as scanning laser polarimetry. The area under the ROC curve was 0.91 for the GDx with variable corneal compensation Nerve Fiber Indicator versus 0.84 for the global RNFL score.

Table 7. Characteristics of included RNFL photography studies

Study	Populations	Devices	Reference Standard
Hong[83] 2007b	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, FDT 30-2, Stratus OCT, RNFL photographs	Clinical exam, Visual field testing
Medeiros[82] 2004	Healthy Controls (IOP≤22) Suspects (IOP>22) Glaucoma	HFA SAP, RNFL photographs	Clinical exam

FDT = frequency doubling technology; GDx = glaucoma diagnosis; HFA = Humphrey field analyzer; IOP = intraocular pressure; OCT = optical coherence tomography; RNFL = retinal nerve fiber layer; VCC = variable corneal compensation

Tests of Optic Nerve Function

FDT 24-2 Perimetry

Five studies examined the diagnostic accuracy of FDT 24-2 threshold tests using the Humphrey Matrix Perimeter (Table 8).[64,93-96] All studies included participants with known glaucoma and healthy volunteers and we judged these studies to be at high risk of spectrum bias. The range of sample size was 25 to 174 glaucomatous eyes and 15 to 164 healthy eyes. Sensitivities and specificities were reported for the parameters mean deviation, pattern standard deviation and glaucoma hemifield test outside of normal limits. There was appreciable heterogeneity in the estimates of sensitivity at 80, 90 and 95 percent specificity that may be attributed to a number of factors including different patient populations and variations in cut-off points. The sensitivity for the mean deviation was 55 and 94 percent at 80 percent fixed specificity.[94,95] Tafreshi (2009) and Leeprechanon (2007) reported 39 and 87 percent at 90 percent fixed specificity, and 32 and 82 percent at fixed 95 percent specificity respectively.[93,95] Sensitivity and specificity for pattern standard of deviation (PSD) and glaucoma hemifield test are reported with respective cut-off points in the evidence tables in Appendix C.

Bagga (2006)[64] and Burgansky-Eliash (2007)[96] reported the AUC for the mean deviation parameter (0.69 for both studies with $p < 0.04$ and 95% CI, 0.564 to 0.815 respectively). The AUCs for PSD were 0.66 ($p = 0.09$)[64] and 0.733 (95% CI, 0.618 to 0.848).[96]

Table 8. Characteristics of included FDT 24-2 perimetry studies

Study	Populations	Devices	Reference Standard
Bagga[64] 2006	Healthy Controls (IOP≤21) Glaucoma	FDT 24-2, GDx-VCC, Goldmann tonometer, HFA SWAP-FT, Stratus OCT	Optic nerve assessment
Burgansky-Eliash[96] 2007	Healthy Controls (IOP ≤21) Glaucoma	FDT 24-2, HFA SITA-Standard	Clinical exam, Visual field testing
Leeprechanon[95] 2007	Healthy Controls (IOP ≤21) Glaucoma	FDT 24-2	Clinical exam, Visual field testing
Racette[94] 2008	Healthy Controls (IOP ≤23) Glaucoma	FDT 24-2, FDT N30, HFA SAP-SITA	Optic nerve photographs
Tafreshi[93] 2009	Healthy Controls (IOP≤22) Glaucoma	FDT-24-2, HFA SAP-SITA, HFA SWAP-SITA	Optic disc photographs

FDT = frequency doubling technology; FT = full threshold; GDx = glaucoma diagnosis; HFA = Humphrey field analyzer; IOP = intraocular pressure; OCT = optical coherence tomography; SAP = standard automated perimetry; SITA = Swedish interactive threshold algorithm; SWAP = short wavelength automated perimetry; VCC = variable corneal compensation

FDT 30-2 Perimetry

Two studies discuss the detection of early glaucoma using the FDT 30-2 threshold test with the Humphrey Matrix Perimeter (Table 9).[60,83] Both Hong (2007a)[60] and Hong (2007b)[83] enrolled OAG participants with early visual field loss and healthy controls. The mean deviation and PSD were judged to be good parameters for distinguishing between eyes with early disease and eyes with no known defects. The mean deviation was 0.795 and 0.750 and the PSD 0.808 and 0.934 for Hong (2007a) and Hong (2007b) respectively. Both study groups, however, determined that the best parameter for distinguishing eyes with early glaucoma from healthy eyes was the number of points that have p less than 5 percent in the pattern deviation plot with AUCs of 0.985 (95% CI, 0.943 to 0.998) and 0.990 ($p < 0.001$) in Hong (2007a) and Hong (2007b) respectively.

Table 9. Characteristics of included FDT 30-2 perimetry studies

Study	Populations	Devices	Reference Standard
Hong[60] 2007a	Healthy Controls (IOP ≤21) Glaucoma	FDT 30-2	Visual field testing, Optic nerve assessment
Hong[83] 2007b	Healthy Controls (IOP ≤21) Glaucoma	GDx-VCC, FDT 30-2, Stratus OCT, RNFL photographs	Clinical exam, Visual field testing

FDT = frequency doubling technology; GDx = glaucoma diagnosis; IOP = intraocular pressure; OCT = optical coherence tomography; RNFL = retinal nerve fiber layer; VCC = variable corneal compensation

FDT C-20 Perimetry

Four studies discussed the accuracy of FDT C-20 perimetry (Table 10).[18,81,91,92] Pueyo (2009) enrolled 130 participants with ocular hypertension and 48 healthy volunteers.[18] Using a cut-off of a cluster of at least four points with a sensitivity outside 95 percent normal limits, or three points outside 98 percent, or at least one point outside 99 percent, investigators determined the sensitivity of FDT to be 31.25 percent and specificity 72.9 percent among the subset of 32 participants with glaucomatous optic neuropathy (of the 130 with ocular hypertension). The investigators concluded that FDT might not be an ideal test for participants with early defects.

Salim (2009) enrolled 35 participants with known OAG and 35 age- and sex-matched controls with no evidence of glaucoma. Investigators used FDT, non-contact tonometry, and a questionnaire individually and in all possible combinations to determine the accuracy of single and combination tests.[91] Sensitivity of FDT was 58.1 percent and specificity 98.6 percent. Overall, FDT was determined to be the best among the candidate single and combination tests in the study, despite fair sensitivity for detecting OAG.

Pierre-Filho (2006) enrolled glaucoma patients who had never experienced perimetry prior to the study.[92] The investigators reported that 21 (32.8%) of the 64 participants with glaucoma were identified as having early disease, but data were not provided for this subgroup. Sensitivity and specificity were 85.9 and 73.6 percent for the presence of at least one abnormal location and 82.8 and 83 percent respectively for two or more abnormal locations regardless of severity.

Francis (2011) conducted a population-based screening of 6,082 Latinos aged 40 years and older as a part of the Los Angeles Latino Eye Study (LALES) to determine the diagnostic accuracy of candidate screening tests performed alone or in combination.[81] Participants completed Humphrey Visual Field testing in addition to FDT C-20-1, Goldmann applanation tonometry, and central corneal thickness and cup to disc ratio measurements. Diagnostic test accuracy outcomes were assessed for the general population as well as high risk subgroups defined as persons who were 65 years and older, those with a family history of glaucoma, and

persons with diabetes. Of the 6,082 participants screened, 4.7 percent (286) were diagnosed as having open-angle glaucoma. Based on three glaucoma diagnosis definitions (glaucomatous optic nerve appearance, glaucomatous visual field loss, glaucomatous optic nerve and visual field loss) the test parameters vertical cup to disc ratio ≥ 0.8 and Humphrey Visual Field (HVF) false negatives ≥ 33 percent had the highest specificity regardless of the definition of glaucoma (98%). HVF mean deviation < 5 percent had the highest sensitivity (78%) using the definition of optic nerve defects only, while HVF glaucoma hemifield test had the highest sensitivity under the other two definitions (90% for glaucomatous visual field loss and 90% for both field loss and optic nerve damage). Specific results for the FDT C-20-1 were as follows (sensitivity/specificity, definition of glaucoma): 59%/79%, glaucomatous optic nerve appearance only; 68%/80%, glaucomatous visual field loss only; 67%/79%, both glaucomatous optic nerve appearance and visual field loss). The investigators reported similar results when high-risk subgroups were analyzed and concluded "these results suggest that screening of high-risk groups based on these criteria may not improve over screening of the general population over age 40."

Table 10. Characteristics of included FDT C-20 perimetry studies

Study	Populations	Devices	Reference Standard
Francis[81] 2011	Population-based sample	FDT C-20, SITA 24-2, Goldman tonometer, Disc photographs	Clinical exam, Visual field testing, Optic disc photographs
Pierre-Filho[92] 2006	Healthy Controls (IOP ≤21) Glaucoma (IOP ≥22)	FDT N30, FDT C-20, HFA SITA Fast, HFA SITA Standard, Octopus 301	Clinical exam
Pueyo[18] 2009	Healthy Controls (IOP≤21) OHT patients (>21)	HRT II, Stratus OCT, FDT C-20, HFA SWAP-FT, GDx-VCC	Clinical exam
Salim[91] 2009	Healthy Controls (IOP ≤21) Glaucoma (IOP ≥22)	Reichert NCT, FDT C-20, Questionnaire	Clinical exam

FDT = frequency doubling technology; FT = full threshold; GDx = glaucoma diagnosis; HFA = Humphrey field analyzer; HRT = Heidelberg retina tomography; IOP = intraocular pressure; OCT = optical coherence tomography; SITA = Swedish interactive threshold algorithm; SWAP = short wavelength automated perimetry; VCC = variable corneal compensation

FDT N-30 Perimetry

Four studies examined the accuracy of the FDT N30 threshold test (Table 11).[20,94,97,98] Zeppieri (2010) focused on the detection of early glaucoma among a sample of 75 participants with OAG, 87 with ocular hypertension, 67 with glaucomatous optic neuropathy and 90 healthy volunteers.[20] At the best cut-off of less than -0.78, the sensitivity of the mean deviation parameter was 61.3 percent and the specificity was 73.7 percent for distinguishing early OAG from healthy eyes. At the best cut-off of greater than 3.89, the sensitivity of the PSD was 76.0 percent and the specificity was 87.8 percent. The investigators concluded that, "FDT can potentially detect eyes with very early functional defects that do not show structural changes in patients at risk of developing glaucoma." Salvetat (2010) focused on the detection of early disease among a sample of 52 participants with early OAG and 53 healthy volunteers.[98] The sensitivity of mean deviation for distinguishing early OAG from healthy eyes at the best cut-off (less than -1.12) was 67 percent and the specificity was 74 percent. At the best cut-off of greater than 3.97, the sensitivity of the parameter PSD was 96 percent and the specificity was 85 percent.

Table 11. Characteristics of included FDT N-30 perimetry studies

Study	Populations	Devices	Reference Standard
Racette[94] 2008	Healthy Controls (IOP ≤23) Glaucoma	FDT 24-2, FDT N-30, HFA SAP-SITA	Optic nerve assessment
Salvetat[98] 2010	Healthy Controls Suspects (IOP >21)	FDT N-30	Visual field testing, IOP measurement
Sample[97] 2006	Healthy Controls (IOP ≤23) OHT patients (IOP >23) Glaucoma	FDT N-30, HFA SAP-FT, HFA SWAP-FT	Clinical exam, Optic disc photographs
Zeppieri[20] 2010	Healthy Controls (IOP ≤21) OHT patients (IOP >21) Glaucoma (IOP >21)	FDT N-30, GDx-VCC, HRT II	Clinical exam, Visual field testing

FDT = frequency doubling technology; FT = full threshold; GDx = glaucoma diagnosis; HFA = Humphrey field analyzer; HRT = Heidelberg retina tomography; IOP = intraocular pressure; OHT = ocular hyphertension; RNFL = retinal nerve fiber layer; SAP = standard automated perimetry; SITA = Swedish interactive threshold algorithm; SLO = scanning laser ophthalmoscope; SWAP = short wavelength automated perimetry; VCC = variable corneal compensation

Humphrey Visual Field Analyzer (HFA)

Ten studies examined the diagnostic accuracy of the HFA. Of these, six examined HFA short wavelength automated perimetry,[18,44,64,93,97,99] two tested HFA-SAP, (SAP)-SITA and HFA SAP-Full Threshold (FT),[93,97] four examined HFA-SITA-Standard,[33,90,92,96] and one tested the HFA SITA-Fast protocol (Table 12).[92] The HFA short wavelength automated perimetry testing protocol (the most frequently reported) included 25 to 286 participants with glaucoma and 22 to 289 healthy volunteers across the six included studies. Sensitivity across all comparisons and cutoffs for the mean deviation was 25.9 to 83 percent. Specificity was 80 to 95.2 percent. Cutoff points ranged from -5.42 to -11.06 dB.

Table 12. Characteristics of included Humphrey visual field analyzer studies

Study	Populations	Devices	Reference Standard
Bagga[64] 2006	Healthy Controls (IOP ≤21) Glaucoma	FDT 24-2, GDx-VCC, Goldmann tonometer, HFA SWAP-FT, Stratus OCT	Optic nerve assessment
Burgansky-Eliash[96] 2007	Healthy Controls (≤21) Glaucoma	FDT 24-2, HFA SITA-Standard	Clinical exam, Visual field testing
Danesh-Meyer[33] 2006	Healthy Controls Suspects (IOP 22-30) Glaucoma	HFA SITA-Standard, HRT II, RFNL photographs	Clinical exam
Ng[99] 2007	Healthy Controls (≤21) Glaucoma (≥22)	HFA SWAP-FT, HFA SWAP-SITA	Optic disc photographs
Pierre-Filho[92] 2006	Healthy Controls (≤21) Glaucoma (≥22)	FDT C20, HFA SITA-Fast, HFA SITA-Standard, Octopus 301 G1-TOP	Clinical exam
Pueyo[18] 2009	Healthy Controls (IOP ≤21) OHT patients (IOP >21)	HRT II, Stratus OCT, FDT C20, HFA SWAP-FT, GDx-VCC	Clinical exam
Reus[90] 2004	Healthy Controls (IOP ≤21) Glaucoma	Glaucoma hemifield test, HFA SAP, Clinical exam	Clinical exam, Visual field testing
Sample[97] 2006	Healthy Controls (≤23) OHT patients (>23) Glaucoma	FDT N30, HFA SAP-FT, HFA SWAP-FT	Clinical exam, Optic disc photographs

Table 12. Characteristics of included Humphrey visual field analyzer studies (continued)

Study	Populations	Devices	Reference Standard
Tafreshi[93] 2009	Healthy Controls (≤22) Glaucoma	FDT-24-2, HFA SAP-SITA, HFA SWAP-SITA	Optic disc photographs
Zhong[44] 2010	Healthy Controls (≤21) Normal Tension Glaucoma (IOP ≤21)	Stratus OCT, HFA SWAP	Clinical exam, Visual field testing, IOP measurement

FDT = frequency doubling technology; FT = full threshold; GDx = glaucoma diagnosis; HFA = Humphrey field analyzer; HRT = Heidelberg retina tomography; IOP = intraocular pressure; OCT = optical coherence tomography; OHT = ocular hypertension; RNFL = retinal nerve fiber layer; SAP = standard automated perimetry; SITA = Swedish interactive threshold algorithm; SWAP = short wavelength automated perimetry; VCC = variable corneal compensation

Goldmann Applanation Tonometry (GAT)

Two studies[64,81] included examination of Goldmann applanation tonometry (GAT) (Table 13). Bagga (2006) compared the ability of various tests of structure and function to discriminate healthy eyes (n= 22) from eyes with known glaucomatous optic neuropathy (n = 25).[64] The AUC for intraocular pressure, as measured by GAT, was 0.66 (p = 0.05). The methods of the Francis (2011) study (LALES) are discussed in the FDT C-20 section of this review, but the specific sensitivity and specificity values for GAT using a cut off of ≥ 21 mm Hg for the three definitions of glaucoma were as follows (sensitivity/specificity, definition of glaucoma: 21%/97%, glaucomatous optic nerve appearance only; 23%/97%, glaucomatous visual field loss only; 24%/97%, both glaucomatous optic nerve appearance and visual field loss).

Table 13. Characteristics of included Goldmann applanation tonometry studies

Study	Populations	Devices	Reference Standard
Bagga[64] 2006	Healthy Controls (≤21) Glaucoma	HFA-SAP, FDT 24-2, GDx-VCC, Goldmann tonometer, HFA SWAP-FT, Stratus OCT	Optic nerve assessment
Francis[81] 2011	Population-based sample	FDT C20, SITA 24-2, Goldman applanation tonometer, Disc photographs	Clinical exam, Visual field testing, Optic disc photographs

FDT = frequency doubling technology; FT = full threshold; GDx = glaucoma diagnosis; HFA = Humphrey field analyzer; OCT = optical coherence tomography; SAP = standard automated perimetry; SITA = Swedish interactive threshold algorithm; SWAP = short wavelength automated perimetry; VCC = variable corneal compensation

Noncontact Tonometry

Salim (2009) included noncontact tonometry, individually and in all possible combinations, with other measures of structure and function to determine the accuracy of single and combination tests (Table 14).[91] Intraocular pressure, as measured by noncontact tonometry, was found not to be a very sensitive test for detecting glaucoma (sensitivity 22.1%). The investigators acknowledge that use of topical medications by the glaucoma participants could limit the ability to identify those with disease.

Table 14. Characteristics of included noncontact tonometry studies

Study	Populations	Devices	Reference Standard
Salim[64] 2009	Healthy Controls (≤21) Glaucoma (>22)	Reichert NCT, FDT C20, Questionnaire	Clinical exam

FDT = frequency doubling technology; NCT = noncontact tonometry

Tendency-Oriented Perimetry

Pierre-Filho (2006) compared frequency-doubling technology (FDT), tendency-oriented perimetry using the Octopus 301 G1-TOP program, SITA Standard and SITA Fast in 117 eyes (64 with glaucoma and 53 healthy eyes) (Table 15).[92] The Octopus 301 perimeter test was considered abnormal under two conditions: when the mean defect was" > 2dB and/or the loss variance > 6 dB (TOP 1), and… there were at least seven points (three of them contiguous) with a reduction in sensitivity ≥ 5 dB in the corrected comparisons graphic (TOP 2)." The sensitivity using definition TOP 1 was 87.5 percent (95% CI: 76.3–94.1%) and the specificity was 56.6 percent (95% CI: 42.4–69.9%). With definition TOP 2 the sensitivity was 89.1 percent (95% CI: 78.2–95.1%) and the specificity was 62.3 percent (47.9–74.9%).

Table 15. Tendency-oriented perimetry

Study	Populations	Devices	Reference Standard
Pierre-Filho [92] 2006	Healthy Controls (≤21) Glaucoma (≥22)	FDT C20, HFA SITA-Fast, HFA SITA-Standard, Octopus 301 G1-TOP	Clinical exam

FDT = frequency doubling technology; HFA = Humphrey field analyzer; SITA = Swedish interactive threshold algorithm

Grading of Evidence

The grading of the evidence for this comparative effectiveness review is summarized in Table 16. We judged the overall strength of evidence to be low based on a summary assessment of the risk of bias, consistency, directness, and precision of the included studies. We concluded that the 83 observational studies were at high risk of bias primarily due to the large percentage (68%) that enrolled participants who were not representative of those who would receive the test in practice. We determined that the wide variability in effects sizes and significant clinical heterogeneity contributed to inconsistency in the evidence base. The evidence is also indirect as we did not identify any studies that linked screening to the final health outcomes of interest (Figure 1). The sensitivity and specificity of the candidate screening tests were determined to be imprecise due to the wide confidence intervals accompanying the point estimates.

Table 16. Grading of evidence

Number of Studies; Participants	Risk of Bias	Consistency	Directness	Precision	Strength of Evidence
Sensitivity and Specificity of Candidate Screening Tests					
83; 15,000+	Observational/High	Inconsistent	Indirect	Imprecise	Low

Applicability

The applicability of the evidence is limited by the participants, tests, and setting selected for the included studies (Tables 2–15). Three of the 83 studies included a population-based sample and the remaining included healthy participants and those with known or suspected glaucoma at the time of screening. Given that the majority of the studies included those with known or suspected disease, the evidence is not applicable to routine screening and primary care settings and the estimates of sensitivity and specificity may be overestimates of the true effect given that the spectrum of disease represented in the studies includes more severely affected individuals compared to those who are unaffected (healthy controls). The included tests not only varied with

respect to the skill required to operate and interpret the findings, portability, and availability, but were also devices that are almost exclusively found in eye care provider settings. The exceptions are tonometry and ophthalmoscopy, which may be found in primary care settings, but have limited sensitivity to detect persons with glaucoma. Finally, although we intended to include a discussion of the validity of community and non-eye care health provider screenings, the studies that met the inclusion criteria were conducted in eye care provider settings only. As a result, the findings of this comparative effectiveness review are not generalizable to primary care and other non-eye care settings.

Conclusion

Based on the Burr (2007) findings,[7] standard automated perimetry was compared with other tests available at the time. SAP had higher sensitivity than Goldmann tonometry, similar sensitivity compared to HRT, and lower sensitivity than disc photos or FDT. In terms of specificity, SAP performed better than disc photos and FDT, similar to HRT, and worse than Goldmann tonometry.

We identified several additional studies assessing the performance of glaucoma screening tests not included in the Burr review. The studies included newer imaging (GDx, HRT III, OCT) and functional (Short Wavelength Automated Perimetry, new FDT patterns) technologies. However, despite improvements in the technology, it is still not clear that there is any one test or combination of tests suitable for use in glaucoma screening in the general population. Significant barriers to identifying and characterizing potential glaucoma screening tests remain including the lack of a definitive diagnostic reference standard for glaucoma and the heterogeneity in the design and conduct of the studies. Because of these barriers, the ranges of sensitivities, specificities, and areas under the ROC curve are large and prevent a coherent synthesis.

Key Question 4

We did not identify any study that addressed whether participation in an OAG screening-based program leads to reductions in intraocular pressure when compared to another screening-based program or no screening.

Key Question 5

Evidence From Systematic Reviews

Hatt (2006) undertook a systematic review of randomized trials of screening modalities for OAG compared to no screening (including opportunistic case finding and referral). There were no restrictions on included populations.[16] The primary outcome of interest was the prevalence of visual field loss, defined as the proportion of participants with a pre-specified severity of visual field loss diagnosed by either manual or automated field assessment. Other primary outcomes included the prevalence of optic nerve damage and visual impairment. Electronic searches of five databases including MEDLINE and CENTRAL were conducted in 2006 and again in January 2009, but none of the studies that were identified were eligible for inclusion. The review authors acknowledged that randomized controlled trials require lengthy follow-up and are predicated on identifying appropriate candidate tests that may be incorporated into a screening-based program.

Detailed Analysis of Primary Studies

We did not identify any primary study that addressed whether participation in an OAG screening-based program leads to reductions in visual field loss or optic nerve damage when compared to another screening-based program or no screening.

Key Question 6

We did not identify any study addressing the harms associated with screening for OAG.

Discussion

The purpose of this Comparative Effectiveness Review was to summarize the evidence linking screening for glaucoma to intermediate and functional health outcomes of treatment. We did not identify evidence to address five of the six key questions of interest as there were no population-based studies that screened and followed treated or untreated asymptomatic persons with disease that also included a suitable comparison group of early glaucoma patients identified via case finding, referral or a different screening-based program (Figure 1).

The investigators of the evidence report Primary Care Screening for Ocular Hypertension and Primary Open-Angle Glaucoma: Evidence Synthesis,[100] commissioned by the Agency for Healthcare Research and Quality in 2005, found no evidence assessing screening and subsequent treatment of glaucoma in a population setting and concluded that while there was good evidence to suggest that treating early primary open angle glaucoma is beneficial, based on the lack of evidence regarding screening, more research is needed to address whether screening is "effective in improving vision-specific functional outcomes and health-related quality of life."[6] As our updated search of the literature was unable to identify any evidence linking screening to the pre-specified intermediate and functional outcomes, we also conclude that more research is needed to address this question. A randomized controlled trial of glaucoma screening would be the optimal study design as a randomized controlled trial design would allow investigators to enroll participants with similar risk profiles and minimize the risk of lead time bias. The feasibility of a randomized controlled trial would be contingent, however, on both the identification of sufficiently sensitive and specific tests for screening and diagnosing persons with glaucoma and the establishment of a standard definition for open-angle glaucoma.

A sixth Key Question (KQ3) addressed the accuracy of candidate screening/diagnostic tests for glaucoma. In 2005, the investigators of the Primary Care Screening for Ocular Hypertension and Primary Open-Angle Glaucoma: Evidence Synthesis[100] reported the sensitivity and specificity of direct ophthalmoscopy, tonometry, the Henson visual field analyzer, and frequency doubling technology, but concluded that there were no appropriate tests that would support population -based screening to identify asymptomatic persons with early disease.

After completing a systematic review of 40 included studies and 48,000 participants, Burr (2007) concluded that optic disc photography, HRT II, FDT, SAP and Goldmann applanation tonometry were potential candidates for a screening-based program, but acknowledged that given the "imprecision in estimates from the pooled meta-analysis models for the diagnostic performance of each test it was not possible to identify a single test (or even a group of tests) as the most accurate."[7] With respect to the limitations of Burr 2007, the authors note that only a small number of studies were identified for the candidate tests included in the review, thus limiting the ability to conduct sensitivity analyses to determine the effect of pooling estimates from population-based studies and those including persons suspected of having glaucoma at the time of screening. The lack of an agreed upon reference standard for the diagnosis of glaucoma and a limited number of studies that address test performance among those at high risk for glaucoma, were additional limitations of this review.[7]

Building on the comprehensive evaluation by Burr (2007),[7] we identified 83 additional studies evaluating the diagnostic accuracy of candidate tests published as of 6 October 2011. While there is now more evidence regarding Optical Coherence Tomography (OCT), the Heidelberg retina tomograph III (HRT III), and the GDx scanning laser polarimeters, the ability of these devices to identify glaucoma in a screening setting is not well understood for the same reasons as noted by Burr 2007: the lack of a single diagnostic standard for glaucoma and the high

degree of variability in the design and conduct of largely cross-sectional studies of diagnostic accuracy.

The lack of diagnostic standards continues to complicate all studies of glaucoma, including those of screening. The lack of standard definitions results in studies that attempt to address the same questions using different definitions, and results in varied estimates of test accuracy that cannot be appropriately compared across studies. The authors of Burr 2007 also noted this as a limitation of their work, and further note that the optimal reference standard, confirmation of glaucoma at a followup visit, was used by only seven of the 40 included studies. A second reference standard of diagnosis by an ophthalmologist at the time of screening was used more frequently. We adapted the reference standards of Burr 2007 and as well identified significant variability in the reference standard with some investigators relying on clinical examination or disc photographs, or optic nerve assessments only while other investigators defined standards that incorporated clinical examination with both structural and functional measurements. The use of a standard, such as that proposed by Foster (2002)[3] in studies of glaucoma screening or of devices potentially used in screening, would help overcome this problem. Foster proposed that glaucoma should be classified by three levels of evidence. A Category 1 diagnosis, which is considered the highest level of evidence, includes both optic disc and visual field defects consistent with glaucoma. A Category 2 diagnosis of optic nerve defects only (defined as a vertical cup to disc ratio above the 99.5th percentile of the healthy population) would be considered when the assessment of the visual field was not possible or not performed satisfactorily. Finally, a Category 3 diagnosis of glaucoma would be defined as an intraocular pressure above the 99.5th percentile of the healthy population with visual acuity less than 20/400 or evidence of prior glaucoma filtering surgery and visual acuity less than 20/400. A Category 3 diagnosis would be deemed sufficient if the optic disc was not visible and thus no visual field assessment was possible.

More uniform reporting of participant characteristics would also enhance diagnostic studies. Since inclusion criteria are highly variable and the important characteristics of the resulting populations are not uniformly described, synthesis across studies is difficult. Better characterization of participants would also help address the question of whom to screen for glaucoma. It is clear that discriminating healthy participants from those with early glaucoma is more difficult than discriminating healthy participants from those with moderate or advanced glaucoma. If participants were described in enough detail to distinguish those with mild, moderate, or severe disease, it would facilitate secondary questions regarding which groups should undergo screening and which stages of disease should be of primary interest. It may be the case, for instance, that identifying people with severe disease is a reasonable goal of a screening program since such people are likely at the highest risk of visual impairment.

The risk of bias of diagnostic study designs is an additional concern. Many of the glaucoma diagnostic studies included in this review are at high risk of spectrum bias because the investigators compared healthy volunteers with people with known glaucoma at the time of screening. Spectrum bias was a concern in 68 percent of the primary studies included in this review. Enrolling participants who are not representative of those one reasonably expects to encounter in a screening setting results in biased and inflated estimates of diagnostic performance and limits the generalizability of findings. Incorporation bias is another concern as the reference standard should not include one or more tests that comprise the candidate tests under investigation. Incorporation bias was encountered in only 2 percent of the primary studies included in this review. But as noted in Burr (2007), incorporation bias is a very complex issue

when considering the diagnosis of glaucoma. The tests used to diagnose glaucoma are categorized broadly into tests of optic nerve structure or function, so to lessen the risk of incorporation bias, one would have to employ, for example, a test of structure as the reference standard if the candidate test was one of function, but that assumes that "structural (e.g. optic disc) and functional (e.g. visual field) damage occur simultaneously in glaucoma pathogenesis, whereas there is evidence that disc damage precedes manifest visual field loss."[7] Under these circumstances, avoiding use of the same test in the reference standard would be the best alternative to reduce the risk of incorporation bias.

Masking of investigators from the results of the reference standard when interpreting the candidate test results and masking investigators from the results of the candidate tests when interpreting the reference standard should be incorporated into the design of diagnostic studies and reported consistently. The candidate test(s) was/were interpreted without knowledge of the results of the reference test in 28 percent of the included studies but there was insufficient information to make a judgment for 60 percent of the studies.

The World Glaucoma Association's (WGA) 2008 consensus statement is consistent with the conclusions of Burr 2007 as well as our review of the literature.[101] The panel noted that there was no best single or group of tests that may be used for glaucoma screening. The WGA also noted that "optimal screening test criteria are not yet known" as there is a lack of population-based diagnostic studies.

The American Academy of Ophthalmology's (AAO) Preferred Practice Pattern (PPP) for primary open-angle glaucoma (October 2008) includes discussion of population screening for glaucoma.[102] The PPP states that screening may be valuable for high-risk populations and expanded to the larger population once sufficient tests are identified. The panel further noted that intraocular pressure measurements are not effective for screening, that structural assessments of the optic nerve and retinal nerve fiber layer are not appropriate for screening as they require expertise and have been noted as having low reliability, and that the diagnostic accuracy of visual field assessments, which have been used in population screenings, is largely unknown. Our review of the current evidence base further highlights the significant barriers that remain in identifying and characterizing potential glaucoma screening tests.

The AAO PPP panel highlighted FDT as a potential tool for the identification of moderate glaucomatous defects. We found that a large percentage of these studies were at high risk of spectrum bias and thus may present biased estimates of accuracy. There was appreciable heterogeneity in sensitivity estimates as there were varied patient populations and criterion used for the definition of glaucoma. Investigators of the FDT C-20 concluded that FDT may not be ideal for identifying patients with early disease,[18] while investigators of the FDT N-30 concluded that FDT may perform well for identifying early functional defects in at-risk eyes without structural changes.[20] When compared with noncontact tonometry and a questionnaire, FDT was determined to be the best among the candidate single and combination tests in the study, despite fair sensitivity for detecting OAG.[91] The LALES study investigators compared FDT C-20, Humphrey Visual Field testing, Goldmann applanation tonometry, central corneal thickness and cup to disc ratio measurements.[81] The results of the analyses for overall and high risk subgroups were similar and thus the investigators concluded that high-risk group screening, using LALES criteria, may not improve the estimates of test accuracy over population screening of those older than 40 years of age.

The results of this review should be interpreted in light of potential limitations. We did not include studies that were published in languages other than English, as we were unable to

identify appropriate translation services for all non-English abstracts and/or the full text of potentially eligible articles prior to the start of full text screening. This represents a limited number of citations (129 of 3,877; 3%) that were retrieved by the electronic searches at the title and abstract stage. Given that the same indexing criteria were applied to all studies identified by the electronic searches and given that approximately 87 percent of the citations were excluded at the title and abstract stage and 87 percent were excluded at the full text stage, applying these same rates of exclusion, we may have missed a maximum of two potentially eligible foreign language studies. Additionally, as the majority of the studies included participants with known or suspected disease, the evidence is not applicable to routine screening and primary care settings and the estimates of sensitivity and specificity may be overestimates of the true effect.

Screening for glaucoma is a difficult problem due to the fact that it is asymptomatic, has low prevalence, is typically only slowly progressive, and has no agreed upon standard for diagnosis. These issues, while challenging, might be overcome by with a combination of creative thinking with regard to populations amenable to screening and hard work on the necessary studies and diagnostic standards.

Future Research Needs

Given the ongoing lack of evidence regarding screening for open-angle glaucoma (OAG), there is a clear need for appropriate research to fill the multiple gaps that exist. It has repeatedly been suggested that a standard for diagnosis be adopted to allow for synthesis of evidence and comparison of outcomes across studies. Glaucoma professional societies would be well suited to help address this issue and should be encouraged to do so, since it fundamentally limits research in a number of areas, including screening. Some of the important questions are outlined below using the standard Population-Intervention-Comparison-Outcomes format.

Does Screening for Glaucoma Alter Either Intermediate or Final Outcomes?

Population:

- People at risk of glaucoma
    - Age
    - Race

Intervention:

- Randomization to one or more screening tests for glaucoma
- Appropriate followup or treatment based on screening outcome

Outcome:

- Measurements of intermediate outcomes
    - Visual field.
    - Optic nerve damage
- Measurement of final outcomes
    - Visual impairment
    - Patient reported outcomes

What Tests or Devices are Best Able To Identify People With Glaucoma in a Screening Setting?

Population:

- People with glaucoma of various stages, determined using standard criteria
- People without glaucoma, matched to the glaucoma group

Intervention:

- Multiple candidate glaucoma screening tests applied to both groups

Outcome:

- Measures of diagnostic accuracy (sensitivity, specificity, area under the ROC curve) for each device
- Assessment of the comparative effectiveness of devices

Are There Groups in Which Screening Might be More Effective?

Population:

- People at varying degrees of glaucoma risk based on population studies

Intervention:

- One or more glaucoma screening programs or tests
- Definitive diagnosis based on standard definition of disease

Outcome:

- The comparative effectiveness of various tests or programs in terms of identifying glaucoma

Are There Stages of Disease at Which Screening is More Appropriate?

Population:

- People with glaucoma of various stages, determined using standard criteria
- People without glaucoma, matched to the glaucoma group

Intervention:

- One or more glaucoma screening programs or tests
- Definitive diagnosis based on standard definition of disease

Outcome:

- Assessment of the relative benefit of screening for various stages of glaucoma

References

1 Quigley HA, Browman AT. The number of people with glaucoma worldwide in 2010 and 2020. British Journal of Ophthalmology. 2006; 90:262-7.

2 The Eye Diseases Prevalence Research Group. Prevalence of open-angle glaucoma among adults in the United States. Arch Ophthalmol. 2004;122 :532-8.

3 Foster PJ, Buhrmann R, Quigley HA, Johnson GJ. The definition and classification of glaucoma in prevalence surveys. British Journal of Ophthalmology. 2002;86:238-42.

4 Quigley HA, Vitale S. Models of open-angle glaucoma prevalence and incidence in the United States. Investigative Ophthalmology and Visual Science 1997;38:83-91.

5 U.S. Preventive Services Task Force. Screening for glaucoma: Recommendation statement. AHRQ Publication No. 04-0548-A 2005.

6 Fleming C., Whitlock E., Beil T, Smit B., Harris RP. Screening for primary open-angle glaucoma in the primary care setting: an update for the US Preventive Services Task Force. Annals of Family Medicine. 2005;3(2):167-70.

7 Burr JM, Mowatt G, Hernȷndez R et al. The clinical effectiveness and cost-effectiveness of screening for open angle glaucoma: a systematic review and economic evaluation. Health Technol Assess. 2007;11(41).

8 International Classification of Diseases, Ninth Revision (ICD-9). Centers for Disease Control and Prevention 2009.

9 Li T. Bridging the gap between evidence generation and clinical decision making [Ph.D. dissertation] United States -- Maryland: The Johns Hopkins University 2010.

10 Higgins JPT, Altman DG. Chapter 8: Assessing risk of bias in included studies. Cochrane Handbook for Systematic Reviews of Interventions Version 5.0.2 (updated September 2009). The Cochrane Collaboration, 2009.

11 Wells GA, Shea B, O'Connell D et al. The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomized studies in meta-analyses. http://www.ohri.ca/programs/clinical_epidemiology/oxford.htm (Accessed 10 November 2011).

12 Whiting P, Rutjes AW, Reitsma JB, Bossuyt PM, Kleijnen J. The development of QUADAS: a tool for the quality assessment of studies of diagnostic accuracy included in systematic reviews. BMC Medical Research Methodology. 2003;3(25)

13 Atkins D, Best D, Briss PA, et al. Grading quality of evidence and strength of recommendations. BMJ . 2004;328(7454):1490.

14 Owens DK, Lohr KN, Atkins D, et al. AHRQ series paper 5: grading the strength of a body of evidence when comparing medical interventions-Agency for Healthcare Research and Quality and the Effective Health-care Program. J Clinical Epidemiology. 2010;63(5):513-23.

15 Whitlock EP, Lin JS, Chou R, Shekelle P, Robinson KA. Using existing systematic reviews in complex systematic reviews. Ann Intern Med. 2008;148:776-82.

16 Hatt S, Wormald R, Burr J. Screening for prevention of optic nerve damage due to chronic open angle glaucoma. Cochrane Database Syst Rev. 2006;(4):CD006129.

17 Healey PR, Lee AJ, Aung T, Wong TY, Mitchell P. Diagnostic accuracy of the Heidelberg Retina Tomograph for glaucoma a population-based assessment. Ophthalmology. 2010;117(9):1667-73.

18 Pueyo V, Polo V, Larrosa JM, Pablo LE, Ferreras A, Honrubia FM. Ability of optical imaging devices to detect early structural damage in ocular hypertension. Ann Ophthalmol (Skokie). 2009;41(3-4):150-6.

19 Zheng Y, Wong TY, Lamoureux E et al. Diagnostic ability of Heidelberg Retina Tomography in detecting glaucoma in a population setting: the Singapore Malay Eye Study. Ophthalmology. 2010;117(2):290-7.

20 Zeppieri M, Brusini P, Parisi L, Johnson CA, Sampaolesi R, Salvetat ML. Pulsar perimetry in the diagnosis of early glaucoma. Am J Ophthalmol. 2010;149(1):102-12.

21 Saito H, Tsutsumi T, Araie M, Tomidokoro A, Iwase A. Sensitivity and specificity of the Heidelberg Retina Tomograph II Version 3.0 in a population-based study: the Tajimi Study. Ophthalmology. 2009;116(10):1854-61.

22 Medeiros FA, Vizzeri G, Zangwill LM, Alencar LM, Sample PA, Weinreb RN. Comparison of retinal nerve fiber layer and optic disc imaging for diagnosing glaucoma in patients suspected of having the disease. Ophthalmology. 2008;115(8):1340-6.

23 Ferreras A, Pablo LE, Pajarin AB, Larrosa JM, Polo V, Pueyo V. Diagnostic ability of the Heidelberg Retina Tomograph 3 for glaucoma. Am J Ophthalmol. 2008;145(2):354-9.

24 De Leon-Ortega JE, Sakata LM, Monheit BE, McGwin G Jr, Arthur SN, Girkin CA. Comparison of diagnostic accuracy of Heidelberg Retina Tomograph II and Heidelberg Retina Tomograph 3 to discriminate glaucomatous and nonglaucomatous eyes. Am J Ophthalmol. 2007;144(4):525-32.

25 Naithani P, Sihota R, Sony P et al. Evaluation of optical coherence tomography and heidelberg retinal tomography parameters in detecting early and moderate glaucoma. Invest Ophthalmol Vis Sci. 2007;48(7):3138-45.

26 Pueyo V, Polo V, Larrosa JM, Ferreras A, Pablo LE, Honrubia FM. Diagnostic ability of the Heidelberg retina tomograph, optical coherence tomograph, and scanning laser polarimeter in open-angle glaucoma. J Glaucoma. 2007;16(2):173-7.

27 Uysal Y, Bayer A, Erdurman C, Kilic S. Sensitivity and specificity of Heidelberg Retinal Tomography II parameters in detecting early and moderate glaucomatous damage: effect of disc size. Clin Experiment Ophthalmol. 2007;35(2):113-8.

28 Burgansky-Eliash Z, Wollstein G, Bilonick RA, Ishikawa H, Kagemann L, Schuman JS. Glaucoma detection with the Heidelberg retina tomograph 3. Ophthalmology. 2007;114(3):466-71.

29 Shah NN, Bowd C, Medeiros FA et al. Combining structural and functional testing for detection of glaucoma. Ophthalmology. 2006;113(9):1593-602.

30 Medeiros FA, Zangwill LM, Bowd C, Sample PA, Weinreb RN. Influence of disease severity and optic disc size on the diagnostic performance of imaging instruments in glaucoma. Invest Ophthalmol Vis Sci. 2006;47(3):1008-15.

31 Medeiros FA, Zangwill LM, Bowd C, Weinreb RN. Comparison of the GDx VCC scanning laser polarimeter, HRT II confocal scanning laser ophthalmoscope, and stratus OCT optical coherence tomograph for the detection of glaucoma. Arch Ophthalmol. 2004;122(6):827-37.

32 Ferreras A, Polo V, Larrosa JM et al. Can frequency-doubling technology and short-wavelength automated perimetries detect visual field defects before standard automated perimetry in patients with preperimetric glaucoma? J. Glaucoma. 2007;16(4):372-83.

33 Danesh-Meyer HV, Gaskin BJ, Jayusundera T, Donaldson M, Gamble GD. Comparison of disc damage likelihood scale, cup to disc ratio, and Heidelberg retina tomograph in the diagnosis of glaucoma. Br. J. Ophthalmol.. 2006;90(4):437-41.

34 Moreno-Montanes J, Anton A, Garcia N, Olmo N, Morilla A, Fallon M. Comparison of retinal nerve fiber layer thickness values using Stratus Optical Coherence Tomography and Heidelberg Retina Tomograph-III. J Glaucoma. 2009;18(7):528-34.

35 Bozkurt B, Irkec M, Arslan U. Diagnostic accuracy of Heidelberg Retina Tomograph III classifications in a Turkish primary open-angle glaucoma population. Acta Ophthalmol. 2010;88(1):125-30.

36 Reddy S, Xing D, Arthur SN et al. HRT III glaucoma probability score and Moorfields regression across the glaucoma spectrum. J Glaucoma. 2009;18(5):368-72.

37 Oddone F, Centofanti M, Iester M et al. Sector-based analysis with the Heidelberg Retinal Tomograph 3 across disc sizes and glaucoma stages: a multicenter study. Ophthalmology. 2009;116(6):1106-11.e1-3.

38 Takmaz T, Can I. Comparison of glaucoma probability score and Moorfields regression analysis to discriminate glaucomatous and healthy eyes. Eur J Ophthalmol. 2009;19(2):207-13.

39 Moreno-Montanes J, Anton A, Garcia N, Mendiluce L, Ayala E, Sebastian A. Glaucoma probability score vs Moorfields classification in normal, ocular hypertensive, and glaucomatous eyes. Am J Ophthalmol. 2008;145(2):360-8.

40 Badala F, Nouri-Mahdavi K, Raoof DA, Leeprechanon N, Law SK, Caprioli J. Optic disk and nerve fiber layer imaging to detect glaucoma. Am J Ophthalmol. 2007;144(5):724-32.

41 Ferreras A, Pajarin AB, Polo V, Larrosa JM, Pablo LE, Honrubia FM. Diagnostic ability of Heidelberg Retina Tomograph 3 classifications: glaucoma probability score versus Moorfields regression analysis. Ophthalmology. 2007;114(11):1981-7.

42 Mansoori T, Viswanath K, Balakrishna N. Quantification of Retinal Nerve Fiber Layer Thickness in Normal Eyes, Eyes with Ocular Hypertension, and Glaucomatous Eyes with SD-OCT. Ophthalmic Surg Lasers Imaging. 2010;41(6):S50-7.

43 Fang Y, Pan YZ, Li M, Qiao RH, Cai Y. Diagnostic capability of Fourier-Domain optical coherence tomography in early primary open angle glaucoma. Chin Med J (Engl). 2010;123(15):2045-50.

44 Zhong Y, Zhou X, Cheng Y, Xie L. Relation between blue-on-yellow perimetry and optical coherence tomography in normal tension glaucoma. Can J Ophthalmol. 2010;45(5):494-500.

45 Pablo LE, Ferreras A, Schlottmann PG. Retinal nerve fibre layer evaluation in ocular hypertensive eyes using optical coherence tomography and scanning laser polarimetry in the diagnosis of early glaucomatous defects. Br J Ophthalmol. 2010.

46 Rao HL, Zangwill LM, Weinreb RN, Sample PA, Alencar LM, Medeiros FA. Comparison of different spectral domain optical coherence tomography scanning areas for glaucoma diagnosis. Ophthalmology. 2010;117(9):1692-9, 1699.e1.

47 Leite MT, Zangwill LM, Weinreb RN et al. Effect of disease severity on the performance of Cirrus spectral-domain OCT for glaucoma diagnosis. Invest Ophthalmol Vis Sci. 2010;51(8):4104-9.

48 Li G, Fansi AK, Boivin JF, Joseph L, Harasymowycz P. Screening for glaucoma in high-risk populations using optical coherence tomography. Ophthalmology. 2010;117(3):453-61.

49 Park SB, Sung KR, Kang SY, Kim KR, Kook MS. Comparison of glaucoma diagnostic Capabilities of Cirrus HD and Stratus optical coherence tomography. Arch Ophthalmol. 2009;127(12):1603-9.

50 Chang RT, Knight OJ, Feuer WJ, Budenz DL. Sensitivity and specificity of time-domain versus spectral-domain optical coherence tomography in diagnosing early to moderate glaucoma. Ophthalmology. 2009;116(12):2294-9.

51 Moreno-Montanes J, Olmo N, Alvarez A, Garcia N, Zarranz-Ventura J. Cirrus high-definition optical coherence tomography compared with Stratus optical coherence tomography in glaucoma diagnosis. Invest Ophthalmol Vis Sci. 2010;51(1):335-43.

52 Sehi M, Grewal DS, Sheets CW, Greenfield DS. Diagnostic ability of Fourier-domain vs time-domain optical coherence tomography for glaucoma detection. Am J Ophthalmol. 2009;148(4):597-605.

53 Yuksel N, Altintas O, Ozkan B, Karadag S, Caglar Y. Discriminating ability of optical coherence tomography data in staging glaucomatous damage. Can J Ophthalmol. 2009;44(3):297-307.

54 Sung KR, Kim DY, Park SB, Kook MS. Comparison of retinal nerve fiber layer thickness measured by Cirrus HD and Stratus optical coherence tomography. Ophthalmology. 2009;116(7):1264-70, 1270.e1.

55 Polo V, Larrosa JM, Ferreras A, Mayoral F, Pueyo V, Honrubia FM. Retinal nerve fiber layer evaluation in open-angle glaucoma. Optimum criteria for optical coherence tomography. Ophthalmologica. 2009;223(1):2-6.

56 Lu AT, Wang M, Varma R et al. Combining nerve fiber layer parameters to optimize glaucoma diagnosis with optical coherence tomography. Ophthalmology. 2008;115(8):1352-7, 1357.e1-2.

57 Nouri-Mahdavi K, Nikkhou K, Hoffman DC, Law SK, Caprioli J. Detection of early glaucoma with optical coherence tomography (StratusOCT). J Glaucoma. 2008;17(3):183-8.

58 Takahashi H, Chihara E. Impact of diabetic retinopathy on quantitative retinal nerve fiber layer measurement and glaucoma screening. Invest Ophthalmol Vis Sci. 2008;49(2):687-92.

59 Sehi M, Ume S, Greenfield DS. Scanning laser polarimetry with enhanced corneal compensation and optical coherence tomography in normal and glaucomatous eyes. Invest Ophthalmol Vis Sci. 2007;48(5):2099-104.

60 Hong S, Chung W, Hong YJ, Seong GJ. Discriminating ability of Humphrey matrix perimetry in early glaucoma patients. Ophthalmologica. 2007;221(3):195-9.

61 Brusini P, Salvetat ML, Zeppieri M, Tosoni C, Parisi L, Felletti M. Comparison between GDx VCC scanning laser polarimetry and Stratus OCT optical coherence tomography in the diagnosis of chronic glaucoma. Acta Ophthalmol Scand. 2006;84(5):650-5.

62 Sihota R, Sony P, Gupta V, Dada T, Singh R. Diagnostic capability of optical coherence tomography in evaluating the degree of glaucomatous retinal nerve fiber damage. Invest Ophthalmol Vis Sci. 2006;47(5):2006-10.

63 Chen HY, Wang TH, Lee YM, Hung TJ. Retinal nerve fiber layer thickness measured by optical coherence tomography and its correlation with visual field defects in early glaucoma. J Formos Med Assoc. 2005;104(12):927-34.

64 Bagga H, Feuer WJ, Greenfield DS. Detection of psychophysical and structural injury in eyes with glaucomatous optic neuropathy and normal standard automated perimetry. Arch Ophthalmol. 2006;124(2):169-76.

65 Leung CK, Chan WM, Yung WH et al. Comparison of macular and peripapillary measurements for the detection of glaucoma: an optical coherence tomography study. Ophthalmology. 2005;112(3):391-400.

66 Medeiros FA, Zangwill LM, Bowd C, Vessani RM, Susanna R Jr, Weinreb RN. Evaluation of retinal nerve fiber layer, optic nerve head, and macular thickness measurements for glaucoma detection using optical coherence tomography. Am J Ophthalmol. 2005;139(1):44-55.

67 Wollstein G, Ishikawa H, Wang J, Beaton SA, Schuman JS. Comparison of three optical coherence tomography scanning areas for detection of glaucomatous damage. Am J Ophthalmol. 2005;139(1):39-43.

68 Leung CK, Yung WH, Ng AC, Woo J, Tsang MK, Tse KK. Evaluation of scanning resolution on retinal nerve fiber layer measurement using optical coherence tomography in normal and glaucomatous eyes. J Glaucoma. 2004;13(6):479-85.

69 Mori S, Hangai M, Sakamoto A, Yoshimura N. Spectral-domain optical coherence tomography measurement of macular volume for diagnosing glaucoma. J. Glaucoma. 2010;19(8):528-34.

70 Kim NR, Hong S, Kim JH, Rho SS, Seong GJ, Kim CY. Comparison of Macular Ganglion Cell Complex Thickness by Fourier-Domain OCT in Normal Tension Glaucoma and Primary Open-Angle Glaucoma. J Glaucoma. 2011.

71 Oddone F, Centofanti M, Tanga L et al. Influence of disc size on optic nerve head versus retinal nerve fiber layer assessment for diagnosing glaucoma. Ophthalmology. 2011;118(7):1340-7.

72 Girkin CA, Liebmann J, Fingeret M, Greenfield DS, Medeiros F. The effects of race, optic disc area, age, and disease severity on the diagnostic performance of spectral-domain optical coherence tomography. Invest Ophthalmol Vis Sci. 2011;52(9):6148-53.

73 Leite MT, Rao HL, Zangwill LM, Weinreb RN, Medeiros FA. Comparison of the diagnostic accuracies of the Spectralis, Cirrus, and RTVue optical coherence tomography devices in glaucoma. Ophthalmology. 2011;118(7):1334-9.

74 Mansoori T, Viswanath K, Balakrishna N. Quantification of retinal nerve fiber layer thickness in normal eyes, eyes with ocular hypertension, and glaucomatous eyes with SD-OCT. Ophthalmic Surg Lasers Imaging. 2010;41 Suppl:S50-7.

75 Horn FK, Mardin CY, Bendschneider D, Junemann AG, Adler W, Tornow RP. Frequency doubling technique perimetry and spectral domain optical coherence tomography in patients with early glaucoma. Eye (Lond). 2011;25(1):17-29.

76 Shoji T, Sato H, Ishida M, Takeuchi M, Chihara E. Assessment of glaucomatous changes in subjects with high myopia using spectral domain optical coherence tomography. Invest Ophthalmol Vis Sci. 2011;52(2):1098-102.

77 Benitez-del-Castillo J, Martinez A, Regi T. Diagnostic capability of scanning laser polarimetry with and without enhanced corneal compensation and optical coherence tomography. Eur J Ophthalmol. 2011;21(3):228-36.

78 Aptel F, Sayous R, Fortoul V, Beccat S, Denis P. Structure-function relationships using spectral-domain optical coherence tomography: comparison with scanning laser polarimetry. Am J Ophthalmol. 2010;150(6):825-33.

79 Cho JW, Sung KR, Hong JT, Um TW, Kang SY, Kook MS. Detection of glaucoma by spectral domain-scanning laser ophthalmoscopy/optical coherence tomography (SD-SLO/OCT) and time domain optical coherence tomography. J Glaucoma. 2011;20(1):15-20.

80 Reus NJ, Lemij HG, Garway-Heath DF et al. Clinical assessment of stereoscopic optic disc photographs for glaucoma: the European Optic Disc Assessment Trial. Ophthalmology. 2010;117(4):717-23.

81 Francis BA, Varma R, Vigen C et al. Population and high-risk group screening for glaucoma: the Los Angeles Latino Eye Study. Invest Ophthalmol Vis Sci. 2011;52(9):6257-64.

82 Medeiros FA, Zangwill LM, Bowd C, Mohammadi K, Weinreb RN. Comparison of scanning laser polarimetry using variable corneal compensation and retinal nerve fiber layer photography for detection of glaucoma. Arch Ophthalmol. 2004;122(5):698-704.

83 Hong S, Ahn H, Ha SJ, Yeom HY, Seong GJ, Hong YJ. Early glaucoma detection using the Humphrey Matrix Perimeter, GDx VCC, Stratus OCT, and retinal nerve fiber layer photography. Ophthalmology. 2007;114(2):210-5.

84 Chen HY, Huang ML, Tsai YY, Hung PT, Lin EJ. Comparing glaucomatous optic neuropathy in primary open angle and primary angle closure glaucoma eyes by scanning laser polarimetry-variable corneal compensation. J Glaucoma. 2008;17(2):105-10.

85 Parikh RS, Parikh SR, Kumar RS, Prabakaran S, Babu JG, Thomas R. Diagnostic capability of scanning laser polarimetry with variable cornea compensator in Indian patients with early primary open-angle glaucoma. Ophthalmology. 2008;115(7):1167-72.e1.

86 Medeiros FA, Bowd C, Zangwill LM, Patel C, Weinreb RN. Detection of glaucoma using scanning laser polarimetry with enhanced corneal compensation. Invest Ophthalmol Vis Sci. 2007;48(7):3146-53.

87 Mai TA, Reus NJ, Lemij HG. Diagnostic accuracy of scanning laser polarimetry with enhanced versus variable corneal compensation. Ophthalmology. 2007;114(11):1988-93.

88 Kanamori A, Nagai-Kusuhara A, Escano MF, Maeda H, Nakamura M, Negi A. Comparison of confocal scanning laser ophthalmoscopy, scanning laser polarimetry and optical coherence tomography to discriminate ocular hypertension and glaucoma at an early stage. Graefes Arch Clin Exp Ophthalmol. 2006;244(1):58-68.

89 Da Pozzo S, Iacono P, Marchesan R, Fantin A, Ravalico G. Scanning laser polarimetry with variable corneal compensation and detection of glaucomatous optic neuropathy. Graefes Arch Clin Exp Ophthalmol. 2005;243(8):774-9.

90 Reus NJ, Lemij HG. Diagnostic accuracy of the GDx VCC for glaucoma. Ophthalmology. 2004;111(10):1860-5.

91 Salim S, Netland PA, Fung KH, Smith ME, Aldridge A. Assessment of the Student Sight Savers Program methods for glaucoma screening. Ophthalmic Epidemiol. 2009;16(4):238-42.

92 Pierre-Filho Pde T, Schimiti RB, de Vasconcellos JP, Costa VP. Sensitivity and specificity of frequency-doubling technology, tendency-oriented perimetry, SITA Standard and SITA Fast perimetry in perimetrically inexperienced individuals. Acta Ophthalmol Scand. 2006;84(3):345-50.

93 Tafreshi A, Sample PA, Liebmann JM et al. Visual function-specific perimetry to identify glaucomatous visual loss using three different definitions of visual field abnormality. Invest Ophthalmol Vis Sci. 2009;50(3):1234-40.

94 Racette L, Medeiros FA, Zangwill LM, Ng D, Weinreb RN, Sample PA. Diagnostic accuracy of the Matrix 24-2 and original N-30 frequency-doubling technology tests compared with standard automated perimetry. Invest Ophthalmol Vis Sci. 2008;49(3):954-60.

95 Leeprechanon N, Giangiacomo A, Fontana H, Hoffman D, Caprioli J. Frequency-doubling perimetry: comparison with standard automated perimetry to detect glaucoma. Am J Ophthalmol. 2007;143(2):263-71.

96 Burgansky-Eliash Z, Wollstein G, Patel A et al. Glaucoma detection with matrix and standard achromatic perimetry. Br. J. Ophthalmol.. 2007;91(7):933-8.

97 Sample PA, Medeiros FA, Racette L et al. Identifying glaucomatous vision loss with visual-function-specific perimetry in the diagnostic innovations in glaucoma study. Invest Ophthalmol Vis Sci. 2006;47(8):3381-9.

98 Salvetat ML, Zeppieri M, Tosoni C, Parisi L, Brusini P. Non-conventional perimetric methods in the detection of early glaucomatous functional damage. Eye. 2010;24(5):835-42.

99 Ng M, Racette L, Pascual JP et al. Comparing the full-threshold and Swedish interactive thresholding algorithms for short-wavelength automated perimetry. Invest Ophthalmol Vis Sci. 2009;50(4):1726-33.

100 Fleming C, Whitlock E, Beil T, Smit B. Primary care screening for ocular hypertension and primary open-angle glaucoma: evidence synthesis (Structured abstract). Rockville, MD: Agency for Healthcare Research and Quality (AHRQ). 2005;28.

101 Glaucoma Screening. Weinreb R, Healey P, Topouzis F eds. The Global Glaucoma Network. Kugler Publications, 2008.

102 Prum B, Friedman D, Gedde S et al. Primary Open-Angle Glaucoma. 2010. Preferred Practice Pattern.

Abbreviations

AHRQ	Agency for Healthcare Research and Quality
AUC	Area under the receiver operating characteristic curve
COAG	Chronic OAG
EPC	Evidence-based Practice Center
FDT	Frequency doubling technology
GAT	Goldmann applanation tonometry
GDx	Glaucoma diagnosis
HFA	Humphrey field analyzer
HRT	Heidelberg retina tomography
IOP	Intraocular pressure
ITT	Intention to treat
logMAR	Logarithm of the minimum angle of resolution
MRA	Moorfields regression analysis
MD	Mean deviation
NEI-VQF	National Eye Institute Visual Functioning Questionnaire
NFI	Nerve fiber indicator
NCT	Noncontact tonometry
NOS	Newcastle-Ottawa Scale
OAG	Open-angle glaucoma
OCT	Optical coherence tomography
OHT	Ocular hypertension
PSD	Pattern standard deviation
QOL	Quality of life
RCT	Randomized controlled trial
RNFL	Retinal nerve fiber layer
RR	Relative risk
SAP	Standard automated perimetry
SD	Standard deviation
SITA	Swedish interactive threshold algorithm
SLP	Scanning laser polarimetry
SLT	Selective laser trabeculoplasty
SR	Systematic review
SWAP	Short wavelength automated perimetry
TSNIT	Temporal, superior, nasal, inferior, temporal
USPSTF	U.S. Preventive Services Task Force
VAS	Visual analogue scale
VCC	Variable corneal compensation
VCDR	Vertical cup to disc ratio
VF	Visual field

Appendix A. Search Strategy

Glaucoma Screening 10-06-11

PUBMED
("Ocular Hypertension"[mh] OR "ocular hypertension"[tiab] OR "Intraocular Pressure"[mh] OR "intraocular pressure"[tiab] OR “glaucoma, open-angle” [mh] OR “Open angle glaucoma” [tiab] OR “low tension glaucoma” [tiab] OR “normal tension glaucoma” [tiab] OR “pseudoexfoliative glaucoma” [tiab] OR “pseudoexfoliative syndrome” [tiab]) AND (screening[tiab] OR "early diagnosis"[mh] OR "tomography, optical coherence"[mh] OR tomography[tiab] OR OCT OR "tonometry, ocular" [mh] OR perimetry[tiab] OR HRT[tiab] OR "Heidelberg retina tomograph" [tiab] OR "scanning laser polarimetry"[tiab]) AND ("Cohort Studies"[Mesh] OR "Case-Control Studies"[Mesh] OR randomized controlled trial [pt] OR controlled clinical trial [pt] OR randomized [tiab] OR placebo [tiab] OR drug therapy [sh] OR randomly [tiab] OR trial [tiab] OR groups [tiab]) NOT (animals [mh] NOT humans [mh]) **3147 titles**

EMBASE
('intraocular hypertension'/exp OR 'ocular hypertension':ab,ti OR 'intraocular pressure'/exp OR 'intraocular pressure':ab,ti OR 'open angle glaucoma'/exp OR 'open angle glaucoma':ti,ab OR 'low tension glaucoma':ti,ab OR ‘normal tension glaucoma’:ti,ab OR ‘pseudoexfoliative glaucoma’:ti,ab OR ‘pseudoexfoliative syndrome’:ab,ti) AND ('screening':ab,ti OR 'early diagnosis'/exp OR 'optical coherence tomography'/exp OR 'tomography':ab,ti OR 'oculoplethysmography'/exp OR perimetry:ab,ti OR hrt:ab,ti OR ‘Heidelberg retina tomograph ‘:ti,ab OR ‘scanning laser polarimetry’:ti,ab OR oct:ab,ti) AND (‘randomized controlled trial’:pt OR ‘controlled clinical trial’:pt OR randomized:ab OR placebo:ab OR 'clinical trial'/exp OR randomly:ab OR trial:ti OR 'cohort analysis'/exp OR 'case control study'/exp) NOT (animals/exp NOT humans/exp) **810 titles**

LILACS
glaucoma$ AND ('screening'$ OR 'early diagnosis'$ OR 'optical coherence tomography'$ OR 'tomography'$ OR 'oculoplethysmography'$ OR perimetry$ OR hrt$ OR ‘Heidelberg retina tomograph ‘$ OR ‘scanning laser polarimetry’$ OR oct) **60 titles**

COCHRANE
glaucoma AND ('screening' OR 'early diagnosis' OR 'optical coherence tomography' OR 'tomography' OR 'oculoplethysmography' OR perimetry OR hrt OR ‘Heidelberg retina tomograph ‘ OR ‘scanning laser polarimetry’ OR oct) **410 titles**

Appendix B. Screening and Data Abstraction Forms

Submit Form and go to or Skip to Next

1. **EXCLUDE article (please select one reason for exclusion):**

No original data (systematic review, meta-analysis, narrative review, editorial, letter) No human data

Includes pediatric population only (see A for population inclusions)

Includes population with suspected narrow angles/angle closure glaucoma only or confirmed angle closure glaucoma only (see A for population inclusions) Does not examine candidate screening tests for glaucoma (see B for tests)

Does not address any key questions (see C for questions)

Is a case series of less than 100 participants/eyes

Other (specify): Clear Response

2. **Include Article**

Include Article

3. **Unclear**

Unclear/ No abstract

4. **FLAG excluded article**

Useful reference (retrieve for hand searching)

A. Population inclusions

- Asymptomatic general population (not previously tested/diagnosed)
- Asymptomatic high risk subgroups (family history, racial/ethnic groups, older age, and specific ocular or other medical conditions, e.g., diabetes, myopia)
- Suspected open-angle glaucoma subgroups (identified from prior testing as having one or more risk factor(s), but diagnosis unconfirmed)

For studies examining: a) long term outcomes among confirmed open-angle glaucoma patients previously identified via screening or b) screening/diagnostic test accuracy:

- Confirmed open-angle glaucoma subgroups
    - Open angle glaucoma (primary or secondary)
    - Ocular hypertension
    - Normal tension glaucoma o
    - Low tension glaucoma
    - Pigmentary glaucoma
    - Pseudoexfoliative glaucoma /pseudoexfoliation syndrome

B. Screening/diagnostic examinations (performed alone or in any possible combination; sequential or simultaneous testing conditions are included)

- Tonometry (contact and non contact)
- Perimetry (visual field analyzers, frequency doubling technology)
- Ophthalmoscopy (direct and indirect)
- Optic disc or retinal nerve fiber layer assessments (fundus photography, computerized imaging of the posterior pole, optical coherence tomography, retinal tomography, scanning laser polarimetry)

C Key Questions

KQ1: a) Does a screening-based program for open-angle glaucoma lead to less visual impairment* when compared to no screening program? b) How does visual impairment vary when comparing different screening-based programs for open-angle glaucoma?
*Visual impairment as defined by the World Health Organization, International Classification of Diseases 9th Revision (ICD 9 CM)

KQ2: a) Does a screening-based program for open-angle glaucoma lead to improvements in patient-reported outcomes when compared to no screening? b) How do patient-reported outcomes vary when comparing different screening-based programs for open-angle glaucoma?

KQ3: What is the predictive value of screening tests for open-angle glaucoma?

KQ4: a) Does a screening-based program for open-angle glaucoma lead to reductions in intraocular pressure when compared to no screening program? b) How does intraocular pressure vary when comparing different screening-based programs for open-angle glaucoma?

KQ5: a) Does a screening-based program lead to a slowing of the progression of optic nerve damage and visual field loss when compared to no screening program? b) How do optic nerve damage and visual field loss vary when comparing different screening-based programs for open angle glaucoma?

KQ6: What are the harms associated with screening for open-angle glaucoma?

Submit Form and go to or Skip to Next

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A

Submit Form and go to [ ] or Skip to Next

1. **Exclude article If (please choose one)**

- ( ) No original data (e.g., systematic review, narrative review, editorial, letter)
- ( ) No human data
- ( ) Includes pediatric population only (see A for population inclusions)
- ( ) It does not address the adequate population (see A for population inclusions)
- ( ) Does not examine candidate screening tests for glaucoma (see B for tests)
- ( ) Does not address any key questions (see C for questions)
- ( ) Is a case series of less than 100 participants/eyes
- ( ) Data not abstractable
- ( ) Unspecified diagnosis of Glaucoma (for KQ3)
- ( ) Other (specify): [ ]

Clear Response

2. **Include Article**
Check the Key Question it addresses (you may check more than one)

- [ ] KQ1: a) Does a screening-based program for open-angle glaucoma lead to less visual impairment* when compared to no screening program? b) How does visual impairment vary when comparing different screening-based programs for open-angle glaucoma?
- [ ] KQ2: a) Does a screening-based program for open-angle glaucoma lead to improvements in patient-reported outcomes when compared to no screening? b) How do patient-reported outcomes vary when comparing different screening-based programs for open-a
- [ ] KQ3: What is the predictive value of screening tests for open-angle glaucoma?
- [ ] KQ4: a) Does a screening-based program for open-angle glaucoma lead to reductions in intraocular pressure when compared to no screening program? b) How does intraocular pressure vary when comparing different screening-based programs for open-angle
- [ ] KQ5: a) Does a screening-based program lead to a slowing of the progression of optic nerve damage and visual field loss when compared to no screening program? b) How do optic nerve damage and visual field loss vary when comparing different screening-ba
- [ ] KQ6: What are the harms associated with screening for open-angle glaucoma?

3. **Check the study design ONLY for included article**

- [ ] Randomized Controlled Trial / Quasi-Randomized Controlled Trial / Randomized Cross-over
- [ ] Other trial (e.g., Cross over trials, before-after, switch, controlled trial)
- [ ] Observational study (Cohort studies, Case control studies)
- [ ] Case report/Case series with more than 100 patients

4. **Non-english article**

- ( ) Non-english article (Specify if possible) [ ]

Clear Response

5. **Comments**

[ ]

A. Population inclusions

- Asymptomatic general population (not previously tested/diagnosed)
- Asymptomatic high risk subgroups (family history, racial/ethnic groups, older age, and specific ocular or other medical conditions, e.g., diabetes, myopia, ocular hypertension)
- Suspected open-angle glaucoma subgroups (identified from prior testing as having one or more risk factor(s), but diagnosis unconfirmed)

Populations exclusions

- Populations with previous surgery**For studies examining: a) long term outcomes among confirmed open-angle glaucoma patients previously identified via screening or b) screening/diagnostic test accuracy: Include**

Primary OAG

Ocular Hypertension

Ocular
Normal and low tension glaucoma Pigmentary glaucoma
Pseudoexfoliative

Exclude
Angle-closure glaucoma Juvenile glaucoma/Congenital
Traumatic glaucoma Neovascular glaucoma Refractory
Secondary glaucoma

B. Screening/diagnostic examinations (performed alone or in any possible combination; sequential or simultaneous testing conditions are included)

- Tonometry (contact and non contact)
- Perimetry (visual field analyzers, frequency doubling technology)
- Ophthalmoscopy (direct and indirect)
- Optic disc or retinal nerve fiber layer assessments (fundus photography, computerized imaging of the posterior pole, optical coherence tomography, retinal tomography, scanning laser polarimetry) Water drinking test
-

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Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A

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1. **Triage Exclusions**

- ○ Infrequently used device
- ○ Non-commercially available analysis of data
- ○ Testing in-house scoring system only
- ○ Uses single test to diagnose glaucoma
- ○ Does not use clinical assessment as reference standard
- ○ Other

Clear Response

2. **Original Exclusion Criteria**

- ○ No original data (e.g., systematic review, narrative review, editorial, letter)
- ○ No human data
- ○ Includes pediatric population only (see A for population inclusions)
- ○ It does not address the adequate population (see A for population inclusions)
- ○ Does not examine candidate screening tests for glaucoma (see B for tests)
- ○ Does not address any key questions (see C for questions)
- ○ Is a case series of less than 100 participants/eyes
- ○ Data not abstractable
- ○ Unspecified diagnosis of Glaucoma (for KQ3)
- ○ Other (specify):

Clear Response

3. **Comments**

4. **Include article**

☐ Include

A. Population inclusions

- Asymptomatic general population (not previously tested/diagnosed)
- Asymptomatic high risk subgroups (family history, racial/ethnic groups, older age, and specific ocular or other medical conditions, e.g., diabetes, myopia, ocular hypertension)
- Suspected open-angle glaucoma subgroups (identified from prior testing as having one or more risk factor(s), but diagnosis unconfirmed)

Populations exclusions

- Populations with previous surgery

For studies examining: a) long term outcomes among confirmed open-angle glaucoma patients previously identified via screening or b) screening/diagnostic test accuracy:

Include
Primary OAG
Ocular Hypertension
Normal and low tension glaucoma
Pigmentary glaucoma
Pseudoexfoliative

Exclude
Angle-closure glaucoma
Juvenile glaucoma/Congenital
Traumatic glaucoma
Neovascular glaucoma
Refractory
Secondary glaucoma

B. Screening/diagnostic examinations (performed alone or in any possible combination; sequential or simultaneous testing conditions are included)

- Tonometry (contact and non contact)
- Perimetry (visual field analyzers, frequency doubling technology)
- Ophthalmoscopy (direct and indirect)
- Optic disc or retinal nerve fiber layer assessments (fundus photography, computerized imaging of the posterior pole, optical coherence tomography, retinal tomography, scanning laser polarimetry)

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Rethnam U, Yesupalan RS, Sinha A

Submit Form and go to [ ] or Skip to Next

Study Design Characteristics

1. What study design was used? (check one):

- ○ Randomized Controlled Trial
- ○ Quasi-Randomized Controlled Trial
- ○ Randomized Cross-Over
- ○ Controlled Trial
- ○ Cross sectional study
- ○ Cross-Over Trial
- ○ Before-After Study
- ○ Switch Study
- ○ Cohort Study
- ○ Case Control Study

2. Was the study:

- ○ Prospective
- ○ Retrospective

Clear Response

3. Is this study part of a bigger study? Please specify the citation number from the article.

- ○ Yes, specify which [ ]
- ○ No

4. Is this study part of a multicenter trial?

- ○ Yes

☐ No

5. In what region did the study occur? (check all that apply):

☐ North America
☐ Europe
☐ Latin America/Caribbean
☐ Asia
☐ Africa
☐ Australia/New Zealand
☐ Not Specified

6. Study setting:

☐ Clinic/Hospital ☐ Doctor's Office
☐ Community
☐ Telemedicine
☐ Not specified

Study Eligibility Criteria

Please select and specify the inclusion and exclusion criteria for the entire study

Previous eye surgery (cateract, laser, glaucoma) ☐ Inclusion ☐ Exclusion
History of ocular trauma ☐ Inclusion ☐ Exclusion
Systemic disease with eye repercussion ☐ Inclusion ☐ Exclusion

Incomplete test

☐ Inclusion ☐ Exclusion

Other

☐ Inclusion ☐ Exclusion

DistillerSR

Project Glaucoma Screening (Switch) **User** darcy.ward (My Settings)

Messages Nothing new

Review | Datarama | Reports | References | Forms | Manage Levels | Users | Logout

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Rethnam U, Yesupalan RS, Sinha A

Submit Form and go to ☐ or Skip to Next

Study Population Characteristics

NORMAL SUBJECTS (describe if necessary)	GLAUCOMA SUSPECTS (describe if necessary)	GLAUCOMA PATIENTS (describe if necessary)

How were the subjects in this population catagorized?	How were the subjects in this population catagorized?	How were the subjects in this population catagorized?
IOP (specify range in mm Hg) ☐ From ☐ To	IOP (specify range in mm Hg) ☐ From ☐ To	IOP (specify range in mm Hg) ☐ From ☐ To
Visual fields (specify type of assessment) ☐ Objective ☐ Subjective Clear Response	Visual fields (specify type of assessment) ☐ Objective ☐ Subjective Clear Response	Visual fields (specify type of assessment) ☐ Objective ☐ Subjective Clear Response
Fundus photography (specify type of assessment) ☐ Objective ☐ Subjective	Fundus photography (specify type of assessment) ☐ Objective ☐ Subjective	Fundus photography (specify type of assessment) ☐ Objective ☐ Subjective

African American/Black:

☐ n

☐ %

Asian:

☐ n

☐ %

Hispanic/Latino:

☐ n

☐ %

Other Race (specify below):

☐ Race:

☐ n

☐ %

Previously screened patients:

☐ n

☐ %

Baseline parameter characteristics

Number assessed at baseline

☐ Eyes

☐ Patients

African American/Black:

☐ n

☐ %

Asian:

☐ n

☐ %

Hispanic/Latino:

☐ n

☐ %

Other Race (specify below):

☐ Race:

☐ n

☐ %

Previously screened patients:

☐ n

☐ %

Baseline parameter characteristics

Number assessed at baseline

☐ Eyes

☐ Patients

African American/Black:

☐ n

☐ %

Asian:

☐ n

☐ %

Hispanic/Latino:

☐ n

☐ %

Other Race (specify below):

☐ Race:

☐ n

☐ %

Previously screened patients:

☐ n

☐ %

Baseline parameter characteristics

Number assessed at baseline

☐ Eyes

☐ Patients

☐ Unspecified Mean deviation (visual field): ☐ Mean ☐ Median ☐ Unspecified Visual field blindness: ☐ % people with ≤ 20/200 ☐ n people with ≤ 20/200 ☐ % people with VF blindness as defined by ICD-9 ☐ n people with VF blindness as defined by ICD-9 ☐ % people with VF blindness defined differently than above (specify) ☐ n people with VF blindness defined differently than above (specify)	☐ Unspecified Mean deviation (visual field): ☐ Mean ☐ Median ☐ Unspecified Visual field blindness: ☐ % people with ≤ 20/200 ☐ n people with ≤ 20/200 ☐ % people with VF blindness as defined by ICD-9 ☐ n people with VF blindness as defined by ICD-9 ☐ % people with VF blindness defined differently than above (specify) ☐ n people with VF blindness defined differently than above (specify)	☐ Unspecified Mean deviation (visual field): ☐ Mean ☐ Median ☐ Unspecified Visual field blindness: ☐ % people with ≤ 20/200 ☐ n people with ≤ 20/200 ☐ % people with VF blindness as defined by ICD-9 ☐ n people with VF blindness as defined by ICD-9 ☐ % people with VF blindness defined differently than above (specify) ☐ n people with VF blindness defined differently than above (specify)

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Rethnam U, Yesupalan RS, Sinha A

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Arm

For what arm of the study were harms reported?

- Arm 1
- Arm 2
- Arm 3
- Arm 4
- Entire study

Clear Response

What was the total number of people, events, or eyes which were assessed for this outcome?

- N People
- N Events
- N Eyes

Harms

Check all that apply and indicate number of events and/or people and/or eyes that experienced each harm

Eye irritation

- N **events**
- N **people**
- N **eyes**

Corneal abrasions

- ☐ N **events**
- ☐ N **people**
- ☐ N **eyes**

Infection (e.g., endophthalmitis)

- ☐ N events
- ☐ N people
- ☐ N eyes

Distortion of sense of taste

- ☐ N events
- ☐ N people
- ☐ N eyes

Exam apprehension

- ☐ N events
- ☐ N people
- ☐ N eyes

Psychological effects

- ☐ N events
- ☐ N people
- ☐ N eyes

Eye irritation

- ☐ N **events**
- ☐ N **people**
- ☐ N **eyes**

Harms related to overdiagnosis

- [ ] N **events**
- [ ] N **people**
- [ ] N **eyes**

Submit Form and go to or Skip to Next

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Rethnam U, Yesupalan RS, Sinha A.

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Bias for Key Question 3

If there is insufficent information to make a judgement then it should scored as "unclear"

1. Was the spectrum of patients representative of the patients who will receive the test in practice?

   Studies should score "yes" for this item if you believe, based on the information reported or obtained from the study's authors, that the spectrum of patients included in the study was representative of those in whom the test will be used in practice.
   Studies which recruit a group of healthy controls and a group known to have the target disorder will be coded as "no" on this item in nearly all circumstances. If you think the population studied does not fit into what you specified as acceptable the item should be scored as "no."

   - Yes
   - No
   - Unclear

2. Were selection criteria clearly described?

   If you think that all relevant information regarding how participants were selected for inclusion in the study has been provided then this item should be scored "yes."
   If study selection criteria are not clearly reported then this item should be scored as "no."

   - Yes
   - No
   - Unclear

3. Is the reference standard likely to correctly classify the target condition?

   If you believe that the reference standard is likely to correctly classify the target condition or is the best method available, then this item should be scored "yes."
   If you do not think that the reference standard was likely to have correctly classified the target condition then this item should be scored as "no."

   - Yes

☐ No
☐ Unclear

4. Is the time period between reference standard and index test short enough to be reasonably sure that the target condition did not change between the two tests?

If you think the time period between the performance of the index test and the reference standard was insufficiently long that disease status may have changed between the performance of the two tests then this item should be scored as "yes."
If the time period between the tests was sufficiently long that disease status may have changed this item should be scored as "no."

☐ Yes
☐ No
☐ Unclear
☐ N/A

5. Did patients receive the same reference standard regardless of the index test result?

If it is clear that patients received verification of their true disease status using the same reference standard then this item should be scored as "yes."
If some patients received verification using a different reference standard this item should be scored as "no."

☐ Yes
☐ No
☐ Unclear

6. Was the reference standard independent of the index test (i.e. the index test did not form part of the reference standard)?

If it is clear from the study that the index test did not form part of the reference standard then this item should be scored as "yes."
If it appears that the index test formed part of the reference standard then this item should be scored as "no."

☐ Yes
☐ No
☐ Unclear

7. Was the execution of the index test described in sufficient detail to permit replication of the test?

If the study reports sufficient details or citations to permit replication of the index test this item should be scored as "yes."
In other cases this item should be scored as "no."

☐ Yes
☐ No
☐ Unclear

8. Was the execution of the reference standard described in sufficient detail to permit its replication?

If the study reports sufficient details or citations to permit replication of the reference standard this item should be scored as "yes."

In other cases this item should be scored as "no."

- ☐ Yes
- ☐ No
- ☐ Unclear

9. Were the index test results interpreted without knowledge of the results of the reference standard?

If the study clearly states that the index test results were interpreted blind to the results of the reference standard then this item should be scored as "yes."
If this does not appear to be the case it should be scored as "no."

- ☐ Yes
- ☐ No
- ☐ Unclear

10. Were the reference standard results interpreted without knowledge of the results of the index test?

If the study clearly states that the reference standard results were interpreted blind to the results of the index test then this item should be scored as "yes."
If this does not appear to be the case it should be scored as "no."

- ☐ Yes
- ☐ No
- ☐ Unclear

11. Were the same clinical data available when test results were interpreted as would be available when the test is used in practice?

If clinical data (defined broadly to include any information relating to the patient obtained by direct observation such as age, sex and symptoms) would normally be available when the test is interpreted in practice and similar data were available when interpreting the index test in the study then this item should be scored as "yes." Similarly, if clinical data would not be available in practice and those data were not available when the index test results were interpreted then this item should be scored as "yes."
If this is not the case then this item should be scored as "no."

- ☐ Yes
- ☐ No
- ☐ Unclear

12. Were uninterpretable/ intermediate test results reported?

If it is clear that all test results, including uninterpretable/indeterminate/intermediate are reported then this item should be scored as "yes."
If you think that such results occurred but have not been reported then this item should be scored as "no."

- ☐ Yes
- ☐ No
- ☐ Unclear

13. Were withdrawals from the study explained?

If it is clear what happened to all patients who entered the study, for example if a flow diagram of study participants is reported, then this item should be scored as "yes."
If it appears that some of the participants who entered the study did not complete the study, i.e. did not receive both the index test and reference standard, and these patients were not accounted for then this item should be scored as "no."

- ☐ Yes
- ☐ No
- ☐ Unclear
- ☐ N/A

COMMENTS

Ref ID:_____
Reference standard:_____
Device(s) used:_____
Populations Being Compared: **Glaucoma:** n pts_____ n eyes_____ / **Glaucoma Suspect:** n pts_____ n eyes_____ **Normal:** n pts_____ n eyes_____ / **OHT** pts_____ n eyes_____/
Other:_____ n patients_____ n eyes_____

	PARAMETER	Sens	Spec	ROC	LR+	LR-	Cutoff
IOP	IOP						
	IOP corrected for corneal thickness						
VISUAL FIELDS	Mean deviation/defect (MD)						
	Pattern standard deviation (PSD)						
	Glaucoma Hemifield Test (GHT) Outside Normal						
	Glaucoma Hemifield Test (GHT) Borderline						
	Pointwise linear regression						
	Guided progression analysis (GPA)						
	Visual field index (VFI)						
	Square root of loss variance (sLV)						
	Subjective/Quasi-objective assessment						
GDx	TSNIT average						
	Superior RNFL average						
	Inferior RNFL average						
	TSNIT standard deviation						
	Inter-Eye Symmetry						
	NFI (Nerve fiber layer index)						
	Normalized inferior						
	Normalized superior						
	Ellipse average						

	PARAMETER	Sens	Spec	ROC	LR+	LR-	Cutoff
	Ellipse SD						
	Ellipse modulation						
	Superior maximum						
	Superior ratio						
	Inferior maximum						
	Inferior ratio						
	Maximum modulation						
OCT	Average RNFL thickness						
	Superior quadrant RNFL thickness						
	Inferior quadrant RNFL thickness						
	Nasal quadrant RNFL thickness						
	Temporal quadrant RNFL thickness						
	Superior hemisphere RNFL thickness (Savg)						
	Inferior hemisphere RNFL thickness (Iavg)						
	1 o'clock thickness						
	2 o'clock thickness						
	3 o'clock thickness						
	4 o'clock thickness						
	5 o'clock thickness						
	6 o'clock thickness						
	7 o'clock thickness						
	8 o'clock thickness						
	9 o'clock thickness						
	10 o'clock thickness						
	11 o'clock thickness						
	12 o'clock thickness						
	Smax/Imax						
	Imax/Smax						

PARAMETER	Sens	Spec	ROC	LR+	LR-	Cutoff
Imax/Tavg						
Smax/Navg						
Smax/Tavg						
Smax						
Imax						
Max-Min						
Disc area						
Cup area						
Rim area						
Cup-disc area ratio						
Cup-disc horizontal ratio						
Cup-disc vertical ratio						
VIRA						
HIRW						
GCC Superior						
GCC Inferior						
GCC Total Macula						
GCC FLV %						
GCC GLV%						
GCC RMS%						
Macular Volume						
Average macular thickness						
Superior macular thickness						
Inferior macular thickness						
Unspecified macular thickness						
Central macular thickness						
Macula 1-3mm Temporal						
Macula 1-3mm Superior						

	PARAMETER	Sens	Spec	ROC	LR+	LR-	Cutoff
	Macula 1-3mm Nasal						
	Macula 1-3mm Inferior						
	Macula 3-5mm Temporal						
	Macula 3-5mm Superior						
	Macula 3-5mm Nasal Macula 3-5mm Inferior						
HRT	Disc area						
	Rim area						
	Rim volume						
	Cup area						
	Cup volume						
	Cup Shape Measure						
	Linear cup-disc ratio						
	Mean cup depth						
	Maximum cup depth						
	Height variation contour						
	Mean height contour						
	Mean RNFL thickness						
	RNFL cross sectional area						
	Vertical cup-disc ratio						
	Horizontal cup-disc ratio						
	Cup/Disc area ratio						
	Rim/Disc area ratio						
	MRA Overall						
	MRA Global						
	MRA temporal inferior						
	MRA temporal superior						
	MRA nasal inferior						

	PARAMETER	Sens	Spec	ROC	LR+	LR-	Cutoff
	MRA nasal superior						
	MRA nasal						
	MRA temporal						
	GPS Value						
	GPS Overall						
	GPS Global						
	GPS temporal inferior						
	GPS temporal superior						
	GPS nasal inferior						
	GPS nasal superior						
	GPS temporal						
	Mikelberg (FSM) Discriminant Function						
	Mardin Discriminant Function						
	Contour Line Modulation (CLM) temp-inf						
	Contour Line Modulation (CLM) temp-sup						
	Reference Height						
	Bathija Discriminant Function						
	Burk (RB) Discriminant Function						
Disc Photos	Vertical cup disc ratio						
	Horizontal cup disc ratio						
	Unspecified cup disc ratio						
	Focal rim loss						
	Disc Damage Likelihood Scale (DDLS)						
	Nerve Fiber Layer (NFL/RNFL)						

Other

PARAMETER	Sens	Spec	ROC	LR+	LR-	Cutoff
Unspecified or other grading						

Appendix C. Evidence Tables

Evidence Table 1. Screening systematic reviews

Refid	Citation	KQ	Aim of study	Conclusions	Eligibility criteria?	Types of participants	Types of interventions	Reference standard	Outcomes
[1]	Burr, 2007	3	"The aim of this systematic review was to evaluate the accuracy of candidate screening tests and to provide details of the reliability of the tests and the proportion of people able to complete each test."	"[However] owing to the strongly heterogeneous nature of the data overall and the relatively small number of studies, it was not possible to conclude with certainty whether any one test was definitely Superior in terms of accuracy."	Yes	Participants 40 years and older from population-based and high risk subgroups (family history of glaucoma, myopia, diabetes, black race)	Tests of structure: Ophthalmoscopy, optic disc photography, RNFL photography; HRT II, GDx VCC, OCT, Retinal Thicnkess Analyzer (RTA) Tests of function: FDT, Motion dection perimetry (MDP), Oculokinetic perimetry (OKP), SWAP, white-on white SAP, including Superiorrathreshold and threshold Test of intraocular pressure: Goldmann applanation tonometry (GAT), Non contact tonometry (NCT), Tonopen Tests were compared to other individual and combination tests	Confirmation of open angle glaucoma on follow-up (primary) Diagnosis of open-angle glaucoma requiring treatment as noted by an ophthalmologist (also included)	True positives, false positives, false negatives, and true negatives (or senstivity and specificity) Harms Test acceptability Test reliability

Refid	Citation	Types of studies included			Bibliographic databases searched				Searching						
		RCT	Quasi RCT	Observational	MEDLINE or PubMed	Cochrane CENTRAL	EMBASE	Total	Non-English	All possible years	Unpublished	Ongoing	References	Contact with investigators	Last search date
[1]	Burr, 2007	Yes	No	Yes	Yes	Yes	Yes	5	No	Yes	Yes	Yes	Yes	NR	6 Dec 2005

Refid	Citation	Risk of bias assessment	# included studies	# of participants	Described characteristics	Statistical methods			Source of Superiorport
						Qualitative	Quantitative	Reported	

					of included studies	**synthesis**	**synthesis**	**statistical heterogeneity**	
[1]	Burr, 2007	Yes	40	48,000+	Yes	Yes	Yes	Yes	Government

Refid	**Citation**	**Summary Outcomes**										
		Frequency Doubling Technology (FDT) C-20-1	**Frequency Doubling Technology (FDT) C-20-5**	**Oculokinetic perimetry (OKP)**	**Standard automated perimetry (SAP) Superior rathreshold**	**Standard automated perimetry (SAP) threshold**	**Heidelberg Retina Tomograph (HRT) II**	**Optic disc photography**	**Retinal Nerve Fiber Layer (RNFL) photography**	**Ophthalmoscopy**	**Goldman applanation tonometry (GAT)**	**Non contact tonometry**
[1]	Burr, 2007	Common cut off (3 studies) Sensitivity, 92%; 95% CrI, 65% to 99% Specificity, 94%; 95% CrI, 73% to 99% Diagnostic OR, 181.20; 95% CrI, 25.49 to 2139.00	Common cut off (5 studies) Sensitivity, 78%; 95% CrI, 19% to 99% Specificity, 75%; 95% CrI, 57% to 87% Diagnostic OR, 10.14; 95% CrI, 0.72 to 249.00	Common cut off (4 studies) Sensitivity, 86%; 95% CrI, 29% to 100% Specificity, 90%; 95% CrI, 79% to 96% Diagnostic OR, 57.54; 95%CrI, 4.42 to 1585.00	Common cut off (9 studies) Sensitivity, 71%; 95% CrI, 51% to 86% Specificity, 85%; 95% CrI, 73% to 93% Diagnostic OR, 14.42; 95% CrI, 6.39 to 33.73	Common cut off (5 studies) Sensitivity, 88%; 95% CrI, 65% to 97% Specificity, 80%; 95% CrI, 55% to 93% Diagnostic OR, 29.87; 95% CrI, 5.59 to 159.30	Common cut off (3 studies) Sensitivity, 86%; 95% CrI, 55% to 97% Specificity, 89%; 95% CrI, 66% to 98%) Diagnostic OR, 50.93; 95% CrI, 11.48 to 246.30	Common cut off (6 studies) Sensitivity, 73%; 95% CrI, 61% to 83% Specificity, 89%; 95% CrI, 50% to 99% Diagnostic OR, 21.74; 95% CrI, 2.22 to 100.90	Common cut off (4 studies) Sensitivity, 75%; 95% CrI, 46% to 92% Specificity, 88%; 95% CrI, 53% to 98% Diagnostic OR, 23.10; 95% CrI, 4.41 to 123.50	Common cut off (5 studies) Sensitivity, 60%; 95% CrI, 34% to 82% Specificity, 94%; 95% CrI, 76% to 99% Diagnostic OR, 25.70; 95% CrI, 5.79 to 109.50	Common cut off (9 studies) Sensitivity, 46%; 95% CrI, 22% to 71% Specificity, 95%; 95% CrI, 89% to 97% Diagnostic OR, 14.95; 95% CrI, 4.48 to 48.95	Common cut off (1 study) Sensitivity, 92%; 95% CrI, 62% to 100% Specificity, 92%; 95% CrI, 90% to 94% Diagnostic OR, 134.88; 95% CrI, 171.15 to 1061.00

Refid	Citation	KQ	Aim of study	Conclusions	Eligibility criteria?	Types of participants	Types of interventions	Reference standard	Outcomes
[2]	Hatt, 2006	5	"To determine the impact of screening for OAG compared with opportunistic case findings or current referral practices on the prevalence of and the degree of optic nerve damage due to OAG in screened and unscreened populations."	"On the basis of current evidence, population-based screening for chronic OAG cannot be recommended, although much can be done to improve awareness and encourage at risk individuals to seek testing. In wealthy countries with equitable access to high quality eye care and health education, blindness from chronic OAG should become increasingly rare; much greater challenges face poor and emerging economies and countries where there are substantial health and wealth inequalities. Effectiveness of screening for OAG can be established only by high quality RCTs."	Yes	Participants from any population; investigators anticipated reporting any heterogeneity in populations studied	Any screening protocol for open-angle glaucoma; investigators anticipated reporting various screening tests used in the included studies Screening protocol compared to no screening	NR	Prevalence of any degree of characteristic visual field loss (automated or manual visual field assessment) Prevalence of optic nerve damage Prevalence of visual impairment Mean IOP (at 1 year or more post screening) Harms Quality of life Economic outcomes Technical differences Quality control Rates of participation Contamination Follow-up

Refid	Citation	Types of studies included			Bibliographic databases searched				Searching						
		RCT	Quasi RCT	Observational	MEDLINE or PubMed	Cochrane CENTRAL	EMBASE	Total	Non-English	All possible years	Unpublished	Ongoing	References	Contact with investigators	Last search date
[2]	Hatt, 2006	Yes	No	No	Yes	Yes	Yes	5	Yes	Yes	Yes	Yes	NR	Yes	12 Jan 2009

Refid	Citation	Risk of bias assessment	# included studies	# of participants	Described characteristics of included studies	Statistical methods			Source of Superiorport
						Qualitative synthesis	Quantitative synthesis	Reported statistical heterogeneity	
[2]	Hatt, 2006	Planned but not conducted	0	NA	NA	NA	NA	NA	Government

Refid	Citation	Summary Outcomes										
		Frequency Doubling Technology (FDT) C-20-1	Frequency Doubling Technology (FDT) C-20-5	Oculokinetic perimetry (OKP)	Standard automated perimetry (SAP) Superiorathreshold	Standard automated perimetry (SAP) threshold	Heidelberg Retina Tomograph (HRT) II	Optic disc photography	Retinal Nerve Fiber Layer (RNFL) photography	Ophthalmoscopy	Goldman applanation tonometry (GAT)	Non contact tonometry
[1]	Burr, 2007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Abbreviations: NA = not applicable; NR = not reported

Evidence Table 2. Study design and population characteristics

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[3] Mansoori, T 2010	Cross-sectional	Healthy Controls ≤21) Suspects (24-32) Glaucoma (≥22)	66(66) 55(55) 51(51)	66(66) 55(55) 51(51)	51.1 51.6 57.4	M: 28(42.4%); F:38(57.6%) M: 28(50.9%); F:27(49.1%) M: 23(45.1%); F:28(54.9%)	NR	-1.27 -1.52 -8.20
[4] Fang, Y 2010	Cross-sectional	Healthy Controls (≤21) Glaucoma	42 (42) 34 (34)	42 (42) 34 (34)	56.3 58.4	M: 12(28.6%); F:30(71.4%) M: 15(44.1%); F:19(55.9%)	NR	-1.39 -2.28
[5] Healey, P. R 2010	Cross-sectional	Population-based Healthy Controls Glaucoma	1072 358	1847 (105)	73.7 (overall)			
[6] Pablo, L. E 2010	Cross-sectional	OHT without RNFL defects (≥22) OHT with RNFL defects (≥22)	128 (128) 53 (53)	128 (128) 53 (53)	51.2 52.2	M: 66(51.6%); F:62(48.4%) M: 28(52.8%); F:25(47.2%)	0.33 0.44	0.26 -0.09
[7] Rao, H. L 2010	Cross-sectional	Healthy Controls (≤21) Glaucoma	74 (44) 140 (106)	74 (44) 140 (106)	62 68	NR	0.4 0.7	0.14 -3.67
[8] Pueyo, V 2009	Cross-sectional	Healthy Controls (≤21 OHT patients (>21)	48 (48) 130 (130)	48 (48) 130 (130)	61.3 56.3	NR	0.34 0.46	-0.89 -0.40

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[9] Reus, N. J 2010	Cross-sectional	Healthy Controls (≤21) OHT pts (22-32) Glaucoma (22-32)	40 (40) NR 48 (48)	40 (40) 6 (6) 48 (48)	59 NR 61	M: 19 (48%) NR M: 26 (54%)	NR	0.1 NR -6.56
[10] Li, G 2010	Cross-sectional	Healthy Controls Suspects Glaucoma	NR	NR (210) NR	NR 61 NR	NR M: 53; F: 157 NR	NR	NR
[11] Park, S. B 2009	Cross-sectional	Healthy Controls (≤21) Glaucoma	NR	74(74) 100(100)	51.3 53.7	M: 39; F: 35 M: 42; F: 58	NR	-0.51 -6.67
[12] Zheng, Y 2010	Cross-sectional	Healthy Controls Suspects (<21) Glaucoma	NR	392(196) NR 124(112)	48.9 NR 63.2	M: 59% NR M: 54.5%	NR	-0.37 NR -7.47
[13] Salim, S 2009	Cross-sectional	Healthy Controls (≤21) Glaucoma (≥22)	NR	70(35) 70(35)	54.4 62.3	NR	NR	NR
[14] Chang, R. T 2009	Cross-sectional	Healthy Controls (≤21) Glaucoma	NR	(50) (54)	62.9 67.6	M:9; F: 41 M: 19; F: 35	NR	NR
[15] Zeppieri, M 2010	Cross-sectional	Healthy Controls (≤21) OHT patients (>21) Glaucoma (>21)	90 (90) 87 (87) 75 (75)	90 (90) 87 (87) 75 (75)	53.4 63.6 65.9	NR	0.47 0.23 0.38	-0.04 -0.3 -2.1

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[16] Bozkurt, B 2010	Cross-sectional	Healthy Controls (≤21) Suspects Glaucoma (≥23)	NR	2182 (2182) 49 (49) 66 (66)	56.0 58.1 64.1	NR	NR	NR -1.3 -4.90
[17] Saito, H 2009	Cross-sectional	Population-based Healthy Controls (≤21) Suspects Glaucoma (≥23)		2182 (2182) 49 (49) 66 (66)	56.0 58.1 64.1			NR -1.73 -4.90
[18] Sehi, M 2009	Cross-sectional	Healthy Controls (≤21) Glaucoma	50 (50) 50 (50)	50 (50) 50 (50)	65 68	M:28; F: 22 M:18; F: 32	NR	-0.5 + -1.5 -9.2 + -7.1
[19] Yuksel, N 2009	Cross-sectional	Healthy Controls (≤21) Glaucoma	81 (81) 213 (213)	81 (81) 213 (213)	59.5 60.8	M: 34; F: 47 M: 100; F: 113	0.82 0.80	NR
[20] Sung, K. R 2009	Cross-sectional	Healthy Controls (≤21) Suspects (>21) Glaucoma	60 48 55	60(60) 48(48) 55(55)	51.3 53.3 53.7	NR	NR	-0.67 -0.85 -5.91
[21] Oddone, F 2009	Cross-sectional	Healthy Controls (<22) Glaucoma (>24)	137 (137) 96 (96)	(137) (96)	61 64	M:60; F:77 M:43; F:56	NR	NR
[22] Takmaz, T 2009	Cross-sectional	Healthy Controls (≤21) Glaucoma (>21)	80 (80) 80 (80)	80 (80) 80 (80)	53.6 63.5	M: 45; F: 35 M: 49; F: 31	NR	-0.6 -6.9

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[23] Tafreshi, A 2009	Cross-sectional	Healthy Controls (≤22) Glaucoma	NR	164 (164) 174(174)	60 57	M: 36% M: 47%	NR	-1.09 -4.40
[24] Chen, H. Y 2008	Cross-sectional	Healthy Controls (≤21) POAG (≥22)	45(45) 47(47)	45(45) 47(47)	57.9 61.7	M:22; F:21 M:31; F: 16	NR	-1.38 -4.54
[25] Racette, L 2008	Cross-sectional	Healthy Controls (≤23) Glaucoma	NR	81 85	59 61	M: 33% M: 53%	NR	-0.96 -3.82
[26] Takahashi, H 2008	Cross-sectional	Healthy Controls Suspects Glaucoma	45 (45) 38(38) 47(47)	45 (45) 38(38) 47(47)	68.9 71.3 69.2	NR	0.41 0.80 0.80	-0.42 7.58 6.56
[27] Ferreras, A 2008	Cross-sectional	Healthy Controls (≤21) Glaucoma (≥22)	(93) (90)	(93) (90)	56.4 60.4	M: 38; F: 55 M: 41; F: 49	NR	-1.01 -6.03
[28] Parikh, R. S 2008	Cross-sectional	Healthy Controls (≤21) Glaucoma (≥22)	104 74	104(110) 74 (78)	51.9 55.2	M: 53; F: 51 M: 39; F: 35	NR	-1.74 -3.47
[29] Moreno-Montanes, J 2008	Cross-sectional	Healthy Controls (≤21) OHT patients (>21) Glaucoma	59(59) 40 83	59(59) NR NR	56 63 68	M: 26; F: 33 M: 16; F: 24 M: 45; F: 38	NR	-0.63 -0.99 -4.94

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[30] Naithani, P 2007	Cross-sectional	Healthy Controls (≤21) Suspects (>21) Glaucoma (>21)	NR	60 30 30	60.2 61.0 59.4	NR	NR	0.60 4.93 9.66
[31] Pueyo, V 2007	Cross-sectional	Healthy Controls (≤21) Glaucoma (≥22)	66(66) 73(73)	66(66) 73(73)	64.8 59.0	NR	NR	NR -6.76
[32] Sehi, M 2007	Cross-sectional	Healthy Controls (≤21) Glaucoma	95(95) 63(63)	95(95) 63(63)	55 63	M: 28; F: 67 M: 25; F: 38	NR	-0.88 -4.2
[33] Ferreras, 2007	Cross-sectional	Population-based Healthy controls Glaucoma		71(71 115(115)	59.4 61.9		0.3 0.73	-0.97 -6.49
[34] Hong, S 2007	Cross-sectional	Healthy Controls (≤21) Glaucoma	56(56) 65(65)	56(56) 65(65)	53 55	M: 29(52%) M: 30 (46%)	NR	-0.24 -1.98
[35] Uysal, Y 2007	Cross-sectional	Healthy Controls Early/moderate glaucoma	NR	70(70) 70(70)	47 52	M/F: 43/27 M/F: 30/40	0.45 0.61	-1.09 -6.35
[36] Leeprechanon, N 2007	Cross-sectional	Healthy Controls (≤21) Glaucoma	42(42) 50(50)	56(56) 71(71)	58 62	M/F: 15/27 M/F: 19/31	NR	NR
[37] Burgansky-Eliash, Z 2007	Cross-sectional	Healthy Controls (≤21) Glaucoma	71 (71) 50 (50)	71 50	45 66	21/50 27/23	NR	-0.46 -6.03

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[38] Brusini, P 2006	Cross-sectional	Healthy Controls (≤21) Glaucoma (>21)	NR	62(62) 95 (95)	66 71	NR	NR	-0.5 -3.7
[39] Shah, N. N 2006	Cross-sectional	Healthy Controls Glaucoma	NR	49 (49) 65 (65)	60 66	M: 37% M: 42%	NR	NR
[40] Sample, P. A 2006	Cross-sectional	Healthy Controls (≤23) OHT patients (>23) Glaucoma	NR	(51) (53) (111)	52 60 66	NR	NR	-0.72 -0.36 -2.89
[41] Pierre-Filho Pde, T 2006	Cross-sectional	Healthy Controls (≤21) Glaucoma (≥22)	53 (53) 64 (64)	53 (53) 64 (64)	45.9 57.6	M:25; F: 28 M:27; F: 37	0.25 0.81	NR
[42] Sihota, R 2006	Cross-sectional	Healthy Controls (≤21) Glaucoma (≥22)	NR	160 (160) 134 (134)	NR	NR	NR	NR
[43] Chen, H. Y 2005	Cross-sectional	Healthy Controls (≤20) Glaucoma (≥22)	94 68	94 (94) 69 (unknown)	41 42	M:65; F: 29 M: 27; F: 14	NR	-0.69 -2.65
[44] Bagga, H 2006	Cross-sectional	Healthy Controls (≤21) Glaucoma	22 (22) 25 (25)	NR	55 61	M:7; F: 15 M: 6; F: 19	NR	-0.2 -0.3

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[45] Kanamori, A 2006	Cross-sectional	Healthy Controls (≤21) Suspects OHT patients (>21) Early glaucoma	NR	93(93) 55 (45) 26 (19) 67 (63)	45 48 46 49	M: 53; F: 40 M:22; F: 33 M:14; F: 12 M: 30; F: 37	NR	-0.48 -1.14 -0.63 -3.55
[46] Da Pozzo, S 2005	Cross-sectional	Healthy Controls (≤21) OHT patients (21-30) Glaucoma	46(46) 48(48) 39(39)	46(46) 48(48) 39(39)	50.5 50.0 55.7	M:15(32.6%); F:31(67.4%) M:22(45.8%); F:26(54.2%) M:20(51.3%); F:19(48.7%)	NR	-1.49 -1.42 -8.59
[47] Leung, C. K 2005	Cross-sectional	Healthy Controls (≤21) OHT patients (22-30) Glaucoma patients	46 (46) 48 (48) 39 (39)	46 (46) 48 (48) 39 (39)	50.5 50.0 55.7	M:15; F: 31 M: 22; F: 26 M: 20; F: 19	NR	-1.49 -1.42 -8.59
[48] Medeiros, F. A 2005	Cross-sectional	Healthy Controls (≤21) Glaucoma	78(78) 88(88)	78(78) 88(88)	65 68	NR	NR	-4.96
[49] Wollstein, G 2005	Cross-sectional	Healthy Controls Glaucoma	37 (37) 37 (26)	37 (37) 37 (26)	51.5 60.5	NR	NR	0.04 -5.85
[50] Leung, C. K 2004	Cross-sectional	Healthy Controls (≤21) Suspects (>21) Glaucoma	107 83 124	107 83 124	53.0 53.0 56.2	M:34; F: 73 M: 37; F: 46 M: 65; F: 59	NR	-1.65 -1.99 -0.61

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[51] Reus, N. J 2004	Cross-sectional	Healthy Controls (≤21) Glaucoma	73 (73) 146 (146)	77 (77) 146 (146)	59 61	NR	NR	0.39 -8.45
[52] Medeiros, F. A 2004	Cross-sectional	Healthy Controls (≤21) Glaucoma	66 (66) 75 (75)	66 (66) 75 (75)	65 68	NR	NR	NR -4.87
[53] Medeiros, F. A 2004	Cross-sectional	Healthy Controls (≤22) Suspects (>22) Glaucoma	40 (40) 32 (32) 42 (42)	40 (40) 32 (32) 42 (42)	NR	NR	NR	NR
[54] Mori, S 2010	Cross-sectional	Healthy Controls (≤21) Suspects Glaucoma	NR	35 (35) 24 (24) 26 (26)	60.8 61.7 63.8	M:17(48.6%); F: 18(51.4%) M:10(41.7%); F: 14(58.3%) M:12(46.2%); F: 14(53.8%)	NR	-0.35 -3.28 -14.55
[55] Salvetat, M. L 2010	Cross-sectional	Healthy Controls Suspects (>21)	53(53) 52 (52)	54 (54) 54(54)	58.7 60.2	NR	NR	-0.6 -2.3
[56] Burgansky-Eliash, Z 2007	Cross-sectional	Healthy Controls (≤21) Glaucoma (≥22)	NR	15 (15) 61 (61)	NR	NR	NR	NR
[57] Ferreras, A 2007	Cross-sectional	Healthy Controls (<20) Preperimetric glaucoma Glaucoma (>21)	98 (98) 109 (109) 71 (71)	98 (98) 109 (109) 71 (71)	59.5 60.1 63.2	NR	0.11 0.64 0.70	-0.29 -0.25 -6.72

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[58] Danesh-Meyer, H. V 2006	Cross-sectional	Healthy Controls Suspects (22-30) Glaucoma	NR	42 (42) 23 (23) 45 (45)	NR	NR	NR	NR
[59] Zhong, Y 2010	Case-control	Healthy Controls (≤21) Normal Tension Glaucoma (≤21)	80 (80) 80 (80)	80 (80 80 (80)	51.8 >52	M:40; F: 40 M:41; F: 39	NR	-1.39 -4.79 (44 pts);-10.38 (36 pts)
[60] Leite, M. T 2010	Case-control	Healthy Controls (≤22) Glaucoma	79 (47) 135 (99)	(47) (99)	60 66	M: 34% M:46%	NR	0.06 -5.63
[61] Moreno-Montanes, J 2009	Case-control	Healthy Controls (≤21) Suspects (>21) Glaucoma	NR	69 (69) 60 (60) 111 (111)	39.0 60.5 70.0	M: 23; F: 46 M: 36; F: 24 M: 58; F: 53	0.45 0.53 0.68	-1.2 -0.86 -6.54
[62] Moreno-Montanes, J 2010	Case-control	Healthy Controls (≤21) Glaucoma (≥22)	130 (130) 86 (86)	130 (130) 86 (86)	58.2 60.1	NR	NR	NR
[63] Reddy, S 2009	Case-control	Healthy Controls (<22) Glaucoma	142 (142) NR	142 (142) 247 (247)	49 71	NR	NR	-0.17 -10.15
[64] Ng, M 2009	Case-control	Healthy Controls (≤21) Glaucoma (≥22)	289 (289) 286 (286)	289 (289) 286 (286)	63.5 65.6	M: 38.1%; F: 61.9% M: 44.1%; F: 55.9%	NR	-1.01 -4.49

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[65] Polo, V 2009	Case-control	Healthy Controls <21) Glaucoma (>20)	98(98) 66(66)	98(98) 66(66)	59.6 63.8	NR	0.27 0.77	-0.49 -7.5
[66] Nouri-Mahdavi, K 2008	Case-control	Healthy Controls (≤22) Early glaucoma by disc (>22) Early glaucoma by visual field (>22)	33 (33) 30 (30) 30 (30)	33 30 30	60.1 62.3 64.0	M:12; F: 21 M: 17; F: 13 M: 11; F: 19	NR	-0.2 -0.5 -3.4
[67] Badala, F 2007	Case-control	Healthy Controls (≤21) Glaucoma	46 46	46 46	59 62	M: 20(43%); F: 26(57%) M: 17(37%); F: 29(63%)	NR	0.1 -4.0
[68] De Leon-Ortega, J. E 2007	Case-control	Healthy Controls (<22) Glaucoma	89 (89) 78 (78)	(67) (207)	47 49	F: 59% F: 51%	NR	0.3 -3.5
[69] Medeiros, F. A 2007	Case-control	Healthy Controls (≤21) Glaucoma	NR	94 (55) 102 (68)	59 68	NR	NR	-0.05 -4.03 (median)
[70] Medeiros, F. A 2006	Case-control	Healthy Controls (≤21) Glaucoma	NR	61 (61) 105 (105)	67 68	F: 48 (79%) F: 57 (54%)	NR	-0.80 -3.00
[71] Lu, A. T 2008	Cohort	Healthy Controls (≤21) Glaucoma (>21)	174 (89) 133 (89)	194 (99) 196 132)	56 58	M:20; F:69 M:71; F:61	NR	NR NR

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[72] Medeiros, F A 2008	Cohort	Healthy Controls Glaucoma	NR	42(42) 40(40)	62 66	NR	NR	-0.54(median) -1.28 (median)
[73] Mai, T. A 2007	Cross-over	Healthy Controls (≤21) Glaucoma	(41) (92)	(41) (92)	61 65	NR	NR	0.4 -9.4
[74] Hong, S 2007	Cross-over	Healthy Controls (≤21) Glaucoma	NR	48(48) 72(72)	39 38	M- 20(42%) M- 34 (47%)	NR	-0.43 -2.90
[75] Kim, 2011	Case Control Study	Healthy Controls (<21) Normal tension glaucoma (<21) POAG (>21 mmHg)	58 51 52	58 51 52	55.78 55.55 57.02	n Female : 32 (55.2%) n Female : 29 (56.9%) n Female : 22 (42.3%)	0.41 0.66 0.66	-1.41 -7.09 -7.70
[76] Oddone, 2011	Cross-sectional study	Healthy Controls (<22) POAG (>24 mmHg)	50 70	50 70	64.3 66.2	n Male : 29 n Female : 21 n Male : 42 n Female : 28	NR	-0.4 -8.4
[77] Girkin, 2011	Cross-sectional study	Healthy Controls (<22) POAG	233 (163) 312 (167)	233 (163) 312 (167)	NR	NR	NR	NR
[78] Leite, 2011	Case Control Study	Healthy Controls (<22) POAG	107 (58) 126 (91)	107 (58) 126 (91)	50 70	36% male 46% male		0.32 -5.85
[79] Mansoori, 2010	Case Control Study	Healthy Controls (<21) OHT (24- 32) POAG (>22)	66 55 51	66 55 51	51.06 51.64 57.45	n Male : 28 n Female : 38 n Male : 28 n Female : 27 n Male : 23 n Female : 28	NR	-1.27 -1.52 -8.2

Study	Study Design	Population categories (IOP)	Number of eyes (patients) enrolled	Number of eyes (patients) analyzed	Mean age (years)	Gender Number (%)	Baseline characteristics	
							C/D ratio	Mean deviation
[80] Horn, 2011	Cohort	Healthy Controls OHT (>22) Preperimetric OAG	97 54 77	97 54 77	57.7 58.3 59.2	n Male : 52 n Female : 45 n Male : 29 n Female : 25 n Male : 36 n Female : 41	NR	-0.24 -0.38 -0.18
[81] Shoji, 2011	Cross-sectional study	Healthy Controls (<22) high myopia with glaucoma	31 51	31 51	55.4 53.7	NR	0.54 0.89	1.0 8.1
[82] Benitez-del-Castillo, 2011	Cross-sectional study	Healthy Controls (<21) Glaucoma	55 33	55 33	59.1 63.8	n Male : 22 n Female : 33 n Male : 23 n Female : 10		-1.02 -6.69
[83] Aptel, 2010	Cohort	Healthy Controls (<22) Suspects Glaucoma	40 40 40	40 40 40	60.9 61.7 63.4	n Male : 17 n Female : 23 n Male : 15 n Female : 25 n Male : 14 n Female : 26	NR	-0.73 -1.73 -9.88
[84] Cho, 2011	Cross-sectional study	Healthy Controls Glaucoma patients	43 49	43 49	46.6 51.8	n Male : 27 n Female : 16 n Male : 27 n Female : 22	NR	-0.39 -6.39
[85] Francis, 2011	Cohort	Healthy Controls (<21 mm Hg)	6082	6082	NR	58% Female	0.34	-2.75

Abbreviations: IOP = intraocular pressure; C/D = cup-disc ratio; OHT = ocular hypertension; POAG = primary open-angle glaucoma; NR = not reported; M= male; F = female

Evidence Table 3. Inclusion and exclusion criteria and reference standard

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[3] Mansoori, T 2010	Asia	Best-corrected visual acuity of 20/30 or better, refractive error within ±3 diopters sphere and ±1.5 diopters cylinder, clear ocular media, open angles on gonioscopy	Previous intraocular surgery, neurological disease, ocular trauma, corneal pathology, uveitis, retinal or macular pathology, abnormal discs and peripapillary atrophy	Y	Y		Y		NR
[4] Fang, Y 2010	Asia	Best corrected visual acuity >=20/30; spherical refraction within -6.0 to +4.0 diopters, cylinder correction within +/- 3.0 diopters and antimetropia <= 2 diopters	Previous surgery, ocular trauma, history of retinal disease, optic neuropathy, or uveitis, systemIc diseases, history of diabetes, hypertension, or other diseases that may affect the measurement results	Y					NR
[5] Healey, P. R 2010	Australia	NR	NR		Y			Y	NR
[59] Zhong, Y 2010	Asia	IOP <21	Systemic diseases, neurologic defects, color deficiency	Y	Y		Y		NR
[6] Pablo, L. E 2010	NR	Best corrected visual acuity 20/30 or better, open anterior chamber angle on gonioscopy, refractive error not exceeding +/- 5D spherical equivalent and +/- 2.0 D astigmatism, transparent ocular media, > 18 years old; intraocular pressure >=22, normal SAP in both eyes	Previous surgery, retinal laser procedure, incisional ocular surgery, neurologic disease or history of neurological disease					Y	2 glaucoma specialists

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[7] Rao, H. L 2010	North America	VA of >= 20/40, spherical correction +/- 5D, cylindrical correction +/- 3D, open angles on gonioscopy	Retinal disease, uvetitis, other neuropathy	Y					NR
[60] Leite, M. T 2010	North America	NR	NR		Y	Y			NR
[8] Pueyo, V 2009	Europe	Between 18 and 80, 8/10 on snellen chart, less than 5 diopters	ocular surgery, systemic disease hematological, cardiovascular, and neuro-ophthalmologic disease, retinopathy	Y					NR
[9] Reus, N. J 2010	Europe	NR	Previous surgery, systemic diseases, like DM.	Y					NR
[10] Li, G 2010	North America	Caribbean, African, Hispanic, positive family history	NR	Y					NR
[11] Park, S. B 2009	Asia	spherical +/- 5D, cylindrical +/- 3D	Previous surgery (only for the healthy population), DM	Y					NR
[12] Zheng, Y 2010	Asia	NR	NR	Y					NR

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[13] Salim, S 2009	North America	NR	Previous surgery(cataract), diabetic retinopathy, or macular degeneration, systemic diseases, diabetic retinopathy	Y					NR
[14] Chang, R. T 2009	North America	NR	Incomplete tests, RE>5D spherical, >2.5D cylindrical, retinal disease	Y					NR
[15] Zeppieri, M 2010	North America, Europe, Latin America	NR	Previous surgery (cataract surgery <6 months), ocular trauma, systemic diseases, secondary causes of glaucoma, incomplete tests, advanced glaucomatous visual defects	Y (visual field)	Y (visual field)				NR
				Y (disc exam)		Y (disc exam)			
[61] Moreno-Montanes, J 2009	Europe	20/40 or better	NR	Y	Y		Y		NR
[62] Moreno-Montanes, J 2010	Europe	20/40 or better	Previous surgery, ocular trauma, systemic diseases, ocular trauma	Y	Y				NR
[16] Bozkurt, B 2010	Asia	NR	Incomplete or unreliable tests	Y	Y				NR
[17] Saito, H 2009	Asia	NR	NR	Y	Y	Y			NR

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[18] Sehi, M 2009	North America	NR	Previous surgery except cataract, systemic diseases, incomplete unreliable SAP, retinal disease, peripapilary atriphy>1.7mm form disc center	Y	Y	Y			NR
[63] Reddy, S 2009	North America	NR	Previous surgery, systemic diseases		Y	Y			NR
[19] Yuksel, N 2009	Europe	NR	Previous surgery, ocular trauma, systemic diseases, incomplete tests, 20/40 or greater other eye disease		Y				NR
[20] Sung, K. R 2009	Asia	20/30 or better, +/- 5 diopters	Systematic diseases, including DM	Y	Y			Y	NR
[21] Oddone, F 2009	Europe	NR	Previous surgery, ocular trauma, systemic diseases, DM, incomplete unreliable tests		Y		Y		NR
[22] Takmaz, T 2009	Asia	NR	Previous surgery, ocular trauma Systemic diseases, < 20/25 corrected	Y					NR
[64] Ng, M 2009	North America	NR	Previous surgery, ocular trauma, systematic medications that affect color vision					Y	masked graders
[23] Tafreshi, A 2009	North America	NR	Previous surgery, systemic diseases, color vision deficits not due to glaucoma					Y	NR

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[65] Polo, V 2009	Europe	30 to 70 years 20/30 or better	Previous surgery, systemic diseases, ocular trauma	Y	Y				Expert
[71] Lu, A. T 2008	North America	NR	Previous surgery, ocular trauma, systemic diseases		Y			Y	
[66] Nouri-Mahdavi, K 2008	North America	NR	ocular trauma, systemic diseases, > 5 diopters, <= 20/40	Y					masked clinician
[24] Chen, H. Y 2008	Asia	High-quality images with centered optic disc, well-focused, even and just illuminated through the images, without any motion artifact	Best-corrected visual acuity of <20/40, spherical equivalent outside +/- 5.0 D, cylinder correction > 3.0 D, peripapillary atrophy	Y	Y	Y	Y		NR
[25] Racette, L 2008	North America	NR	Previous surgery except glaucoma and cataract, systemic diseases, incomplete Unreliable tests			Y			NR
[26] Takahashi, H 2008	Asia	Include incomplete test	Incomplete tests, StratusOCT eyes with artifactual errors and remarkable regression of echo beam caused by hard or soft exudates and retinal hemorrhages in the scan circle, coexisting neuro-ophthalmologic disease, uveitis, macular disease, retinal artery or vein occlusion, retinal detachment, history of refractive or intraocular surgery, and degenerative myopia, glaucomatous eyes with visual field defects on fundus photography caused by retinal hemorrhages or exudates		Y	Y			NR

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[72] Medeiros, F. A 2008	North America	NR	non glaucoma optic neuropathy, co-existing retinal disease	Y	Y			Y	
[27] Ferreras, A 2008	Europe	Best corrected visual acuity of 20/40 or better, refractive error within +/- 5 diopters equivalent sphere and +/- 2 diopters of astigmatism, and open anterior chamber angle.	Previous intraocular surgery, systemic diseases, diabetes or other diseases affecting the visual field, history of ocular or neurologic disease, or current use of medication that could affect visual field sensitivity. lens opacity	Y	Y				NR
[28] Parikh, R. S 2008	Asia	20/30 correct or better > 35 years	Previous surgery within 6 months ocular trauma, systemic diseases	Y	Y				NR
[29] Moreno-Montanes, J 2008	Europe	NR	NR	Y	Y				NR
[67] Badala, F 2007	North America	NR	NR	Y	Y				3 masked graders
[68] De Leon-Ortega, J. E 2007	North America	NR	Previous surgery, systemic diseases, problems affecting color vision, significant cataract	Y					NR
[69] Medeiros, F. A 2007	North America	Dx ECC and VCC same day	NR	Y	Y				NR

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[30] Naithani, P 2007	Asia	NR	Previous surgery, ocular trauma, systemic diseases	Y	Y				NR
[31] Pueyo, V 2007	Europe	visual acuity of at least 8/10 Snellen refractive error not exceeding 5 diopters sphere 3 di. cylinder and transparent ocular media	Previous surgery, systemic diseases, any retinopathy, unacceptable images	Y	Y			Y	NR
[32] Sehi, M 2007	North America	NR	Previous surgery except uncomplicated cataract, systemic diseases, peripapillary atrophy within 1.7 mm of OD center unreliable SAP	Y	Y				NR
[73] Mai, T. A 2007	Europe	NR	Previous surgery except uncomplicated cataract, systemic diseases	Y	Y				NR
[33] Ferreras, 2007	Europe	NR	Previous surgery, systemic diseases, use of medication that could affect visual field sensitivity		Y		Y		NR
[34] Hong, S 2007	Asia	NR	Previous surgery		Y	Y			NR
[35] Uysal, Y 2007	Asia	NR	NR		Y	Y			NR
[74] Hong, S 2007	Asia	NR	Systemic diseases	Y	Y				NR
[36] Leeprechanon, N 2007	North America	open angles	Ocular trauma, systemic diseases	Y	Y				NR

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[37] Burgansky-Eliash, Z 2007	North America	NR	Previous surgery except cataract, ocular trauma, systemic diseases	Y	Y				NR
[38] Brusini, P 2006	Europe	NR	Previous surgery, systemic diseases, DM	Y	Y				NR
[39] Shah, N. N 2006	North America	NR	Previous surgery, except uncomplicated catarct/glaucoma, ocular trauma, systemic diseases, secondary glaucoma, color vision deficit not due to glaucoma	Y	Y				masked graders
[40] Sample, P. A 2006	North America	NR	Previous surgery except for uncomplicated cataract surgery, Ocular trauma, systemic diseases, secondary causes of elevated IOP	Y				Y	masked graders
[41] Pierre-Filho Pde, T 2006	Latin America	18 years or older, no previous automated perimetry, corrected VA >= 20/50, and a spherical equivalent of <= +/- 5 D	Ocular trauma,history of systemic or ocular disease other than glaucoma that might interfere with visual field results, pseudophakic eyes and those with significant cataracts greater than moderate lens opacification, according to the Lens Opacity Classification System III	Y					NR
[42] Sihota, R 2006	Asia	NR	Previous surgery, ocular trauma secondary glaucoma, non-glaucomatous neurologic field loss	Y	Y				NR
[43] Chen, H. Y 2005	Asia	NR	Systemic diseases	Y	Y	Y			NR

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[70] Medeiros, F. A 2006	North America	open angles	nonglaucomatous optic neuropathy		Y				NR
[44] Bagga, H 2006	North America	NR	Visual acuity < 20/40			Y			NR
[45] Kanamori, A 2006	Asia	NR	Previous surgery	Y					NR
[46] Da Pozzo, S 2005	Europe	NR	NR	Y	Y				NR
[47] Leung, C. K 2005	Asia	Best-corrected visual acuity of at least 20/40, with spherical refractive error between +3.00 and -6.00 diopters	Previous surgery, laser, systemic diseases, history of diabetes, incomplete tests, inability to complete a reliable visual field test within 3 attempts (reliable was defined as fixation losses <20%, and false positive and false negative rates <25	Y	Y				NR
[48] Medeiros, F. A 2005	North America	Best corrected visual acuity of 20/40 or better, spherical refraction within +/- 5.0 diopters and cylinder correction within +/- 3.0 diopters, and open angles on gonioscopy.	Incomplete scans with overt algorithm failure to detect retinal borders or if one type of scan was classified as unacceptable coexisting retinal disease, uveitis, or nonglaucomatous optic neuropathy	Y					NR
[49] Wollstein, G 2005	North America	best-corrected visual acuity of 20/60 or better, refractive error between '6.00 and +3.00 diopters, no media opacities that would preclude OCT sanning, and no retinal pathologies other than those attributed to glaucoma.	Systemic diseases, diabetes, any medical condition that might affect visual field other than glaucoma, or treatment with medications that might affect retinal thickness	Y	Y				NR

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[50] Leung, C. K 2004	Asia	best corrected visual acuity at least 6/12 and spherical equivalent refractive error not higher than +3.00 or lower than -7.00 diopters.	Previous surgery history of any kind of retinal pathology, retinal laser procedure, retinal surgery, or neurological diseases	Y	Y				NR
[51] Reus, N. J 2004	Europe	open angles on gonioscopy, unremarkable slit-lamp exam, best corrected visual acuity of 20/40 or better	no history of intraocular surgery (except for uncomplicated cataract surgery) systemic hypertension for which medication was used, diabetes mellitus, or any other systemic disease, incomplete tests, measurements flagged by the GDx VCC software as "results may not be compatible with normative database,no significant history of ocular disease	Y	Y				NR
[52] Medeiros, F. A 2004	North America	best-corrected visual acuity of 20/40 or better in the affected eye, spherical refraction within +/- 5.0 diopters (D) and cylinder correction within +/- 3.0 D, and open angles on gonioscopy	Incomplete tests, unacceptable image scans, coexisting retinal disease, uveitis, or nonglaucomatous optic neuropathy.	Y	Y				NR
[53] Medeiros, F. A 2004	North America	NR	retinal disease, uveitis, other optic neuropathies		Y				NR
[54] Mori, S 2010	Asia	best corrected visual acuity of at least 20/40, a spherical refractive error between +3.00 and -6.00 diopters, and open angles confirmed by gonioscopy.	Systemic diseases, neurological disease or a history of diabetes or corticosteroid use		Y	Y			NR

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[55] Salvetat, M. L 2010	Europe	best-corrected visual acuity better than or equal to 0.7 decimal; open anterior chamber angle; absence of ocular pathology other than glaucoma; reliable VF test results; willingness to provide informed consent	Previous surgery, systemic diseases, diabetes mellitus, neurological disorders, medication that could modify VF results, ametropia > +/- 5 diopters, pupil diameter < 2mm; anterior chamber angle alterations; secondary causes of glaucoma; advanced glaucomatous VF defects		Y		Y		NR
[56] Burgansky-Eliash, Z 2007	North America	best-corrected visual acuity >= 20/40 and refractive error within +/- 6.00 Diopters (spherical equivalent) of emetropia	signs of retinal or optic nerve head (ONH) pathologies other than glaucoma, when media opacities interfered with fundus imaging, or if the patient was using medications that are known to affect retinal thickness	Y		Y			3 masked ophthalmologists
[57] Ferreras, A 2007	Europe	best-corrected visual acuity better than 20/30; refractive error < 3 spherical diopters and 2 diopters of cylinder; transparent ocular media (nuclear color/opalescence, cortical, or posterior subcapsular lens opacity <1) according to the Lens Opacities Classification System (LOCS) III; open anterior chamber angle	Previous surgery, systemic diseases, diabetes, history of ocular or neurologic disease, incomplete tests, unavailable and did not complete all the required tests current use of a medication that affects VF sensitivity or history of congenital color vision defects		Y	Y	Y		trained ophthalmologist
[58] Danesh-Meyer, H. V 2006	Australia	NR	Incomplete tests, unreliable visual field tests (fixation losses, false positive, and false negatives > 25%)	Y					NR

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[75] Kim, 2011	Asia	NR	Excluded previous surgery: other than uncomplicated glaucoma and cataract, Excluded systemic diseases with eye repercussions: diseases affecting the visual field, Other reasons for exclusion: no retinal pathology, no family history of glaucoma in first degree relative	Y	Y				NR
[76] Oddone, 2011	Europe	NR	Excluded previous surgery: history of ocular surgery or laser, Excluded ocular trauma, Excluded systemic diseases with eye repercussions: rheumatological systemic diseases, diabetes	Y	Y				NR
[77] Girkin, 2011	North America	NR	Other reasons for exclusion: neurologic, ophthalmic conditions, use of medications	Y	Y				NR
[78] Leite, 2011	North America	NR	Other reasons for exclusion: eyes with co existing retinal disease, uveitis, non glaucomatous optic neuropathy		Y	Y			NR
[79] Mansoori, 2010	Asia	NR	Excluded previous surgery, Excluded ocular trauma, Other reasons for exclusion: neurologic disease, corneal pathology, uveitis, retinal or macular pathology, abnormal disc, peripapillary atrophy		Y	Y	Y		NR
[80] Horn, 2011	Europe	NR	Excluded systemic diseases with eye repercussions: diabetes mellitus, Other reasons for exclusion: all eye disease other than glaucoma, myopic error exceeding +/- 6.75 dioptres	Y	Y			Y	NR
[81] Shoji, 2011	Asia	NR	Excluded previous surgery, Excluded ocular trauma, Other reasons for exclusion: neuro ophthalimic diseases, uveitis, retinal and or choroidal	Y	Y				NR

Study	Region	Inclusion criteria	Exclusion criteria	Reference Standard					Test(s) carried out and interpreted by
				Clinical Exam	Visual field	Optic Nerve	IOP	Photos	
[82] Benitez-del-Castillo, 2011	Europe	NR	Excluded previous surgery: except uncomplicated cataract surgery , Excluded systemic diseases with eye repercussions: neurologic disorders	Y	Y			Y	NR
[83] Aptel, 2010	Europe	NR	Excluded ocular trauma : except cataract	Y	Y				NR
[84] Cho, 2011	Asia	NR	Excluded systemic diseases with eye repercussions: diabetes	Y	Y				NR
[85] Francis, 2011	North America	NR	NR	Y	Y			Y	NR

Abbreviations: SITA = Swedish Interactive Threshold Algorithm; SAP = standard automated perimetry; HFA= Humphrey Field Analyzer; HRT = Heidelberg Retinal Tomograph; GHT = Glaucoma Hemi Threshold; FDT = Frequency Doubling Technology; DDLS = Disc Damage Likelihood Score; HVFA = Humphrey visual field analysis; HVF = Humphrey visual field; PSD = Pattern standard deviation; OCT = Optical coherence tomography; VCC = variable corneal compensation; ECC = enhanced corneal compensation; VF = Visual field; IOP = intraocular pressure; RNFL = Retinal nerve fiber layer; VA = Visual acuity; DM = Diabetes mellitus; NR = not reported

Evidence Table 4. Outcomes table

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
[3] Mansoori, T 2010	Healthy Controls Suspects Glaucoma	66(66) NR 51(51)	OTI OCT	Average RNFL thickness	NR	NR	0.778
				Superior quadrant RNFL thickness	NR	NR	0.819
				Inferior quadrant RNFL thickness	NR	NR	0.934
				Nasal quadrant RNFL thickness	NR	NR	0.611
				Temporal quadrant RNFL thickness	NR	NR	0.601
[4] Fang, Y 2010	Healthy Controls Glaucoma	42 34	RTVue OCT	Average RNFL thickness	76.5	95	0.915
				Superior quadrant RNFL thickness	58.8	95	0.915
				Inferior quadrant RNFL thickness	64.7	95	0.881
				Nasal quadrant RNFL thickness	38.2	95	0.795
				Temporal quadrant RNFL thickness	41.2	95	0.771
				Superior hemisphere RNFL thickness	61.8	95	0.855
				Inferior hemisphere RNFL thickness	64.7	95	0.887
				Disc area	8.8	95	0.476
				Cup area	38.2	95	0.818
				Rim area	61.8	95	0.913
				Cup-disc area ratio	58.8	95	0.894
				Cup-disc Horizontal ratio	17.6	95	0.823
				Cup-disc vertical ratio	79.4	95	0.930
				GCC Superior	38.2	95	0.847
				GCC Inferior	64.7	95	0.893
				GCC total macula	61.8	95	0.907
				Overall RNFL thickness	73.5	95	0.907
[4] Fang, Y 2010	Healthy Controls Glaucoma	42 34	RTVue OCT	Average RNFL thickness	79.4	85	0.915
				Superior quadrant RNFL thickness	79.4	85	0.835
				Inferior quadrant RNFL thickness	73.5	85	0.881

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Nasal quadrant RNFL thickness	64.7	85	0.795
				Temporal quadrant RNFL thickness	58.8	85	0.771
				Superior hemisphere RNFL thickness	67.6	85	0.855
				Inferior hemisphere RNFL thickness	73.5	85	0.887
				Disc area	23.5	85	0.476
				Cup area	64.7	85	0.818
				Rim area	79.4	85	0.913
				Cup-disc area ratio	67.6	85	0.894
				Cup-disc Horizontal ratio	70.6	85	0.823
				Cup-disc vertical ratio	88.2	85	0.930
				GCC Superior	73.5	85	0.847
				GCC Inferior	79.4	85	0.893
				GCC total macula	85.3	85	0.907
				Overall RNFL thickness	79.4	85	0.907
[5] Healey, P. R 2010	Healthy Controls Glaucoma	1552 92	HRT-2	MRA Global	64.1	85.7	NR
[59] Zhong, Y 2010	Healthy Controls NTG	80 (80) 80 (80)	HFA SWAP Visual Field (Blue and Yellow Perimetry)	Mean deviation/ defect (MD)	83	80	0.896
				Pattern standard deviation (PSD)	89	80	0.895
				Mean deviation/ defect (MD)	69	90	0.896
				Pattern standard deviation (PSD)	71	90	0.895
			Stratus OCT	Average RNFL thickness	93	80	0.957

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Superior quadrant RNFL thickness	83	80	NR
				Inferior quadrant RNFL thickness	91	80	0.932
				Nasal quadrant RNFL thickness	81	80	0.893
				Temporal quadrant RNFL thickness	56	80	0.683
				Superior hemisphere RNFL thickness	83	80	0.913
				Imax/Smax	0.545	80	NR
				Imax/TAverage	60	80	0.733
				Smax/NAverage	45	80	0.61
				Smax/TAverage	42	80	0.663
				Smax	78	80	0.876
				Imax	77	80	0.878
				Max-min	48	80	0.730
				Average RNFL thickness	93	90	0.957
				Superior quadrant RNFL thickness	81	90	NR
				Inferior quadrant RNFL thickness	81	90	0.932
				Nasal quadrant RNFL thickness	78	90	0.893
				Temporal quadrant RNFL thickness	47	90	0.683
				Superior hemisphere RNFL thickness	81	90	0.913
				Imax/Smax	0.545	90	NR
				Imax/TAverage	55	90	0.733
				Smax/NAverage	40	90	0.61
				Smax/TAverage	37	90	0.663
				Smax	72	90	0.876
				Imax	73	90	0.878

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Max-min	46	90	0.730
[6] Pablo, L. E 2010	OHT without RNFL defects OHT with RNFL defects	128 (128) 53 (53)	GDX VCC	TNSIT average	81.63	66.36	0.758
				Superior RNFL average	71.43	68.22	0.726
				Inferior RNFL average	71.43	54.21	0.636
				NFI (Nerve fiber layer index)	81.63	53.27	0.739
			Stratus OCT	Average RNFL thickness	54.72	91.41	0.785
				Superior quadrant RNFL thickness	71.43	68.22	0.719
				Inferior quadrant RNFL thickness	79.25	64.84	0.712
				Nasal quadrant RNFL thickness	54.72	87.50	0.733
				Temporal quadrant RNFL thickness	73.58	60.94	0.684
[7] Rao, H. L 2010	Healthy Controls Glaucoma pts	74 (44) 140 (106)	RTVue OCT	Average RNFL thickness	80	80	0.879
				Superior quadrant RNFL thickness	75	80	0.847
				Inferior quadrant RNFL thickness	77.8	80	0.884
				Nasal quadrant RNFL thickness	51.4	80	0.702
				Temporal quadrant RNFL thickness	63.6	80	0.755
				Disc area	43.6	80	0.572
				Cup area	61.4	80	0.737
				Rim area	67.8	80	0.768
				Cup-disc area ratio	69.3	80	0.786
				Cup-disc Horizontal ratio	56.4	80	0.726
				Cup-disc vertical ratio	73.6	80	0.810
				GCC FLV%	78.6	80	0.804
				GCC GLV%	80.7	80	0.819

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				GCC RMS %	75.7	80	0.870
				Average macular thickness	37.1	80	0.609
				Superior macular thickness	30.7	80	0.558
				Inferior macular thickness	42.8	80	0.643
				Average RNFL thickness	65	95	0.879
				Superior quadrant RNFL thickness	47.8	95	0.847
				Inferior quadrant RNFL thickness	71.4	95	0.884
				Nasal quadrant RNFL thickness	20.7	95	0.702
				Temporal quadrant RNFL thickness	23.6	95	0.755
				Disc area	17.9	95	0.572
				Cup area	61.4	95	0.737
				Rim area	53.6	95	0.768
				Cup-disc area ratio	47.8	95	0.786
				Cup-disc Horizontal ratio	35	95	0.726
				Cup-disc vertical ratio	47.1	95	0.810
				GCC FLV%	77.8	95	0.804
				GCC GLV%	76.4	95	0.819
				GCC RMS %	59.3	95	0.870
				Average macular thickness	14.3	95	0.609
				Superior macular thickness	11.4	95	0.558
				Inferior macular thickness	19.3	95	0.643
[60] Leite, M. T 2010	Healthy Controls Glaucoma	79 (47) 135 (99)	Cirrus OCT	Average RNFL thickness	NR	NR	0.892
				Superior quadrant RNFL thickness	NR	NR	0.874
				Inferior quadrant RNFL thickness	NR	NR	0.881
				Nasal quadrant RNFL thickness	NR	NR	0.648

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Temporal quadrant RNFL thickness	NR	NR	0.757
				1 o' clock thickness	NR	NR	0.751
				2 o' clock thickness	NR	NR	0.651
				3 o' clock thickness	NR	NR	0.597
				4 o' clock thickness	NR	NR	0.61
				5 o' clock thickness	NR	NR	0.718
				6 o' clock thickness	NR	NR	0.844
				7 o' clock thickness	NR	NR	0.863
				8 o' clock thickness	NR	NR	0.802
				9 o' clock thickness	NR	NR	0.608
				10 o' clock thickness	NR	NR	0.751
				11 o' clock thickness	NR	NR	0.821
				12 o' clock thickness	NR	NR	0.787
[8] Pueyo, V 2009	Healthy Controls OHT	(48) (130)	HRT-2	MRA global	NR	NR	0.880
			Stratus OCT	Average RNFL thickness	NR	NR	0.742
			FDT C20	Mean deviation (MD)	NR	NR	0.627
			HFA SWAP-FT	Pattern standard deviation (PSD)	NR	NR	0.598
			GDX-VCC	NFI (Nerve fiber layer index)	NR	NR	0.719
[9] Reus, N. J 2010	Healthy Controls OHT pts Glaucoma pts	40 NR 48	Disc Photos	Unspecified	74.7	87.4	NR
			GDX-VCC	NFI (Nerve fiber layer index)	91.7	95.0	NR
[10] Li, G 2010	Healthy Controls Suspects Glaucoma pts	NR	Stratus OCT	Disc area	83.3	28.3	0.64
				Cup area	83.3	81.5	0.86
				Rim area	83.3	6.8	0.23
				Cup-disc area ratio	83.3	75.6	0.86
				Cup-disc Horizontal ratio	83.3	71.7	0.84

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Cup-disc vertical ratio	83.3	81.95	0.88
[11] Park, S. B 2009	Healthy Controls Glaucoma pts	74(74) 100(100)	Cirrus OCT	Average RNFL thickness	80	92	0.953
				Superior quadrant RNFL thickness	72	92	0.926
				Inferior quadrant RNFL thickness	85	92	0.963
				Nasal quadrant RNFL thickness	33	92	0.734
				Temporal quadrant RNFL thickness	42	92	0.722
				1 o' clock thickness	54	91	0.841
				2 o' clock thickness	43	91	0.763
				3 o' clock thickness	24	91	0.583
				4 o' clock thickness	24	91	0.729
				5 o' clock thickness	64	91	0.885
				6 o' clock thickness	76	93	0.918
				7 o' clock thickness	81	91	0.932
				8 o' clock thickness	40	91	0.754
				9 o' clock thickness	26	93	0.572
				10 o' clock thickness	38	93	0.709
				11 o' clock thickness	54	91	0.826
				12 o' clock thickness	61	91	0.876
				Average RNFL thickness	90	81	NR
				Superior quadrant RNFL thickness	85	85	NR
				Inferior quadrant RNFL thickness	96	81	NR
				Nasal quadrant RNFL thickness	51	82	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Temporal quadrant RNFL thickness	52	85	NR
				1 o' clock thickness	68	81	NR
				2 o' clock thickness	54	81	NR
				3 o' clock thickness	39	81	NR
				4 o' clock thickness	44	81	NR
				5 o' clock thickness	77	84	NR
				6 o' clock thickness	85	81	NR
				7 o' clock thickness	86	84	NR
				8 o' clock thickness	63	81	NR
				9 o' clock thickness	24	87	NR
				10 o' clock thickness	47	81	NR
				11 o' clock thickness	68	82	NR
				12 o' clock thickness	80	82	NR
[11] Park, S. B 2009	Healthy Controls Glaucoma pts	74(74) 100(100)	Stratus OCT	Average RNFL thickness	74	91	0.934
				Superior quadrant RNFL thickness	71	92	0.891
				Inferior quadrant RNFL thickness	79	92	0.935
				Nasal quadrant RNFL thickness	40	92	0.775
				Temporal quadrant RNFL thickness	34	93	0.707
				1 o' clock thickness	52	92	0.839
				2 o' clock thickness	27	93	0.746

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				3 o' clock thickness	24	93	0.670
				4 o' clock thickness	45	91	0.759
				5 o' clock thickness	59	91	0.865
				6 o' clock thickness	77	91	0.901
				7 o' clock thickness	76	92	0.901
				8 o' clock thickness	39	91	0.740
				9 o' clock thickness	21	91	0.579
				10 o' clock thickness	39	91	0.740
				11 o' clock thickness	51	92	0.810
				12 o' clock thickness	61	91	0.859
				Average RNFL thickness	92	81	NR
				Superior quadrant RNFL thickness	85	82	NR
				Inferior quadrant RNFL thickness	90	82	NR
				Nasal quadrant RNFL thickness	63	81	NR
				Temporal quadrant RNFL thickness	52	81	NR
				1 o' clock thickness	71	81	NR
				2 o' clock thickness	62	82	NR
				3 o' clock thickness	43	81	NR
				4 o' clock thickness	55	82	NR
				5 o' clock thickness	78	81	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				6 o' clock thickness	82	84	NR
				7 o' clock thickness	82	84	NR
				8 o' clock thickness	56	82	NR
				9 o' clock thickness	39	81	NR
				10 o' clock thickness	54	81	NR
				11 o' clock thickness	66	81	NR
				12 o' clock thickness	74	81	NR
[12] Zheng, Y 2010	Healthy Controls Suspects Glaucoma pts	392(196) NR 124(112)	HRT-2	MRA overall	43.6	97.2	0.704
				Mikelberg (FSM) Discriminant Function	72.6	78.3	0.755
				Bathija discriminant Function	68.6	83.9	0.762
				Burk (RB) Discriminant Function	66.1	84.7	0.762
[13] Salim, S 2009	Healthy Controls Glaucoma pts	70(35) 70(35)	Reichert NCT	IOP	22.1	78.6	NR
			FDT C20	Visual Field- Subjective/Quasi-objective assessment	58.1	98.6	NR
			Questionnaire	Other	48.6	68.6	NR
[14] Chang, R. T 2009	Healthy Controls Glaucoma pts	(50) (54)	Cirrus OCT	Average RNFL thickness	83	88	0.904
			Cirrus OCT	≥1 quadrant 5%	98	80	NR
			Cirrus OCT	≥1 quadrant 1%	87	92	NR
			Cirrus OCT	Abnormal Clock Hours			0.949
			Stratus OCT	Average RNFL thickness	80	94	0.889
			Stratus OCT	≥1 quadrant 5%	96	76	NR
			Stratus OCT	≥1 quadrant 1%	74	94	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
			Stratus OCT	≥1 o'clock: 5%	98	66	NR
			Stratus OCT	≥1 o'clock: 1%	85	90	NR
			Stratus OCT	Abnormal Clock Hours	NR	NR	0.965
[15] Zeppieri, M 2010	Healthy Controls OHT pts Glaucoma pts	90 NR 80	FDT N30	Mean deviation (MD)	61.3	73.3	0.698
				Pattern standard deviation (PSD)	76.0	87.8	0.845
				Mean deviation (MD)	54.6	80	NR
				Pattern standard deviation (PSD)	72	80	NR
				Mean deviation (MD)	42.6	90	NR
				Pattern standard deviation (PSD)	72	90	NR
				Mean deviation (MD)	22.6	95	NR
				Pattern standard deviation (PSD)	48	95	NR
				Mean deviation (MD)	47.8	73.3	0.606
				Pattern standard deviation (PSD)	53.7	83.3	0.711
				Mean deviation (MD)	37.3	80	NR
				Pattern standard deviation (PSD)	53.7	80	NR
				Mean deviation (MD)	22.4	90	NR
				Pattern standard deviation (PSD)	40.3	90	NR
				Mean deviation (MD)	14.9	95	NR
				Pattern standard deviation (PSD)	17.9	95	NR
			GDX-VCC	TSNIT average	60	75.5	0.713

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Superior RNFL average	70.6	78.8	0.781
				Inferior RNFL average	38.6	87.8	0.682
				TSNIT standard deviation	61.3	75.5	0.698
				NFI (Nerve fiber layer index)	62.6	85.5	0.790
				TSNIT average	42.6	80	NR
				Superior RNFL average	65.3	80	NR
				Inferior RNFL average	40	80	NR
				TSNIT standard deviation	50.6	80	NR
				NFI (Nerve fiber layer index)	62.6	80	NR
				TSNIT average	36.0	90	NR
				Superior RNFL average	41.3	90	NR
				Inferior RNFL average	36.0	90	NR
				TSNIT standard deviation	45.3	90	NR
				NFI (Nerve fiber layer index)	58.6	90	NR
				TSNIT average	32	95	NR
				Superior RNFL average	37.3	95	NR
				Inferior RNFL average	25.3	95	NR
				TSNIT standard deviation	25.3	95	NR
				NFI (Nerve fiber layer index)	37.3	95	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				TSNIT average	52.2	75.5	0.653
				Superior RNFL average	53.7	75.5	0.687
				Inferior RNFL average	41.8	87.8	0.643
				TSNIT standard deviation	49.2	78.9	0.660
				NFI (Nerve fiber layer index)	47.8	85.5	0.688
				TSNIT average	38.8	80	NR
				Superior RNFL average	47.8	80	NR
				Inferior RNFL average	41.8	80	NR
				TSNIT standard deviation	47.8	80	NR
				NFI (Nerve fiber layer index)	47.8	80	NR
				TSNIT average 7	32.8	90	NR
				Superior RNFL average	37.3	90	NR
				Inferior RNFL average	34.3	90	NR
				TSNIT standard deviation	40.3	90	NR
				NFI (Nerve fiber layer index)	93.3	90	NR
				TSNIT average	29.8	95	NR
				Superior RNFL average	29.8	95	NR
				Inferior RNFL average	23.9	95	NR
				TSNIT standard deviation	25.4	95	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				NFI (Nerve fiber layer index)	28.3	95	NR
			HRT-2	Disc Area	62.6	73.3	0.691
				Rim area	58.6	63.3	0.610
				Rim volume	61.3	73.3	0.716
				Cup area	65.3	87.8	NR
				Cup volume	73.3	75.7	0.769
				Cup shape measure	65.3	90	0.816
				Linear cup-disc ratio	66.6	83.3	0.805
				Mean cup depth	57.3	78.8	0.741
				Maximum cup depth	38.6	85.3	0.668
				Height variation contour	56.0	73.3	0.687
				Mean RNFL thickness	68.0	75.5	0.764
				RNFL cross-sectional area	58.6	78.8	0.698
				Cup-disc area ration	61.3	57.7	0.518
				MRA global	57.3	92.2	0.753
				Reference height	20.	83.3	0.526
				Disc Area	37.3	80	NR
				Rim area	34.6	80	NR
				Rim volume	50.6	80	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Cup area	65.3	80	NR
				Cup volume	57.3	80	NR
				Cup shape measure	72.0	80	NR
				Linear cup-disc ratio	68.0	80	NR
				Mean cup depth	57.3	80	NR
				Maximum cup depth	38.6	80	NR
				Height variation contour	38.6	80	NR
				Mean RNFL thickness	54.6	80	NR
				RNFL cross-sectional area	54.6	80	NR
				Cup-disc area ration	2.6	80	NR
				MRA global	57.3	80	NR
				Reference height	21.3	80	NR
				Disc Area	22.6	90	NR
				Rim area	24.0	90	NR
				Rim volume	40.0	90	NR
				Cup area	52	90	NR
				Cup volume	56.0	90	NR
				Cup shape measure	65.3	90	NR
				Linear cup-disc ratio	57.3	90	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Mean cup depth	46.6	90	NR
				Maximum cup depth	30.6	90	NR
				Height variation contour	28	90	NR
				Mean RNFL thickness	41.3	90	NR
				RNFL cross-sectional area	37.3	90	NR
				Cup-disc area ratio	0	90	NR
				MRA global	58.6	90	NR
				Reference height	21.3	80	90.3
				Disc Area	16	95	NR
				Rim area	22.6	95	NR
				Rim volume	34.6	95	NR
				Cup area	41.3	95	NR
				Cup volume	40.0	95	NR
				Cup shape measure	48.0	95	NR
				Linear cup-disc ratio	49.3	95	NR
				Mean cup depth	42.6	95	NR
				Maximum cup depth	24.0	95	NR
				Height variation contour	26.6	95	NR
				Mean RNFL thickness	40.0	95	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				RNFL cross-sectional area	30.6	95	NR
				Cup-disc area ratio	0	95	NR
				MRA global	57.3	80	NR
				Reference height	6.6	95	NR
				Disc Area	58.2	73.3	0.707
				Rim area	50.7	65.5	0.584
				Rim volume	59.7	73.3	0.674
				Cup area	64.2	85.5	NR
				Cup volume	76.1	73.3	0.789
				Cup shape measure	68.6	87.8	0.832
				Linear cup-disc ratio	74.6	81.1	0.826
				Mean cup depth	64.2	78.9	0.776
				Maximum cup depth	53.7	78.9	0.699
				Height variation contour	52.2	73.3	0.619
				Mean RNFL thickness	73.1	65.5	0.710
				RNFL cross-sectional area	41.8	76.7	0.618
				Cup-disc area ratio	59.7	60.0	0.533
				MRA global	68.6	92.2	0.803
				Reference height	23.9	83.8	0.565

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Disc Area	40.3	80	NR
				Rim area	28.3	80	NR
				Rim volume	53.7	80	NR
				Cup area	65.7	80	NR
				Cup volume	59.7	80	NR
				Cup shape measure	68.6	80	NR
				Linear cup-disc ratio	74.6	80	NR
				Mean cup depth	59.7	80	NR
				Maximum cup depth	44.8	80	NR
				Height variation contour	31.3	80	NR
				Mean RNFL thickness	43.3	80	NR
				RNFL cross-sectional area	38.8	80	NR
				Cup-disc area ratio	60.9	80	NR
				MRA global	68.6	80	NR
				Reference height	NR	NR	NR
				Disc Area	32.8	90	NR
				Rim area	22.4	90	NR
				Rim volume	35.8	90	NR
				Cup area	49.2	90	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Cup volume	56.7	90	NR
				Cup shape measure	64.2	90	NR
				Linear cup-disc ratio	59.7	90	NR
				Mean cup depth	53.7	90	NR
				Maximum cup depth	34.3	90	NR
				Height variation contour	14.9	90	NR
				Mean RNFL thickness	32.8	90	NR
				RNFL cross-sectional area	28.3	90	NR
				Cup-disc area ratio	0	90	NR
				MRA global	68.6	90	NR
				Reference height	11.9	90	NR
				Disc Area	16.4	95	NR
				Rim area	19.4	95	NR
				Rim volume	32.8	95	NR
				Cup area	40.3	95	NR
				Cup volume	41.8	95	NR
				Cup shape measure	46.3	95	NR
				Linear cup-disc ratio	44.8	95	NR
				Mean cup depth	49.2	95	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Maximum cup depth	28.3	95	NR
				Height variation contour	11.9	95	NR
				Mean RNFL thickness	28.3	95	NR
				RNFL cross-sectional area	25.4	95	NR
				Cup-disc area ratio	0	95	NR
				MRA global	35.8	95	NR
				Reference height	8.9	95	NR
[61] Moreno-Montanes, J 2009	Healthy Controls Suspects Glaucoma	69 (69) NR 111 (111)	HRT-3	Height variation contour	33.9	80	0.54
				Mean RNFL thickness	7.2	98.6	0.72
				Mean RNFL thickness	32.4	87	NR
				Mean RNFL thickness	51.3	80	NR
			Stratus OCT	Average RNFL thickness	58.6	98.55	NR
				Average RNFL thickness	72.97	81.15	0.86
[62] Moreno-Montanes, J 2010	Healthy Controls Glaucoma	130 86	Cirrus OCT	Average RNFL thickness	73.77	85	0.837
				Superior quadrant RNFL thickness	70.49	85	0.838
				Inferior quadrant RNFL thickness	68.85	85	0.827
				Nasal quadrant RNFL thickness	57.28	85	0.742
				Temporal quadrant RNFL thickness	42.62	85	0.697
				1 o' clock thickness	70.49	85	0.818
				2 o' clock thickness	50.82	85	0.758
				3 o' clock thickness	22.31	85	0.603
				4 o' clock thickness	31.15	85	0.644
				5 o' clock thickness	49.18	85	0.762

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				6 o' clock thickness	67.21	85	0.804
				7 o' clock thickness	67.21	85	0.785
				8 o' clock thickness	32.79	85	0.799
				9 o' clock thickness	34.4	85	0.584
				10 o' clock thickness	59.03	85	0.745
				11 o' clock thickness	65.57	85	0.795
				12 o' clock thickness	59.02	85	0.77
				Average RNFL thickness	52.46	95	0.837
				Superior quadrant RNFL thickness	50.82	95	0.838
				Inferior quadrant RNFL thickness	60.66	95	0.827
				Nasal quadrant RNFL thickness	18.03	95	0.742
				Temporal quadrant RNFL thickness	22.95	95	0.697
				Superior hemisphere RNFL thickness	NR	NR	NR
				1 o' clock thickness	40.98	95	0.818
				2 o' clock thickness	22.9	95	0.758
				3 o' clock thickness	9.84	95	0.603
				4 o' clock thickness	10.48	95	0.644
				5 o' clock thickness	29.51	95	0.762
				6 o' clock thickness	60.06	95	0.804
				7 o' clock thickness	55.74	95	0.785
				8 o' clock thickness	13.11	95	0.633
				9 o' clock thickness	14.75	95	0.584
				10 o' clock thickness	40.98	95	0.745
				11 o' clock thickness	54.1	95	0.795
				12 o' clock thickness	36.53	95	0.77
				Average RNFL thickness	68.81	95	0.829

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Superior quadrant RNFL thickness	60.66	85	0.809
				Inferior quadrant RNFL thickness	65.57	85	0.795
				Nasal quadrant RNFL thickness	54.1	85	0.752
				Temporal quadrant RNFL thickness	63.93	85	0.768
				Superior hemisphere RNFL thickness	60.66	85	0.809
				1 o' clock thickness	59.02	85	0.762
				2 o' clock thickness	47.54	85	0.735
				3 o' clock thickness	37.7	85	0.697
				4 o' clock thickness	45.38	85	0.709
				5 o' clock thickness	57.38	85	0.735
				6 o' clock thickness	60.66	85	0.757
				7 o' clock thickness	65.57	85	0.818
				8 o' clock thickness	59.02	85	0.799
				9 o' clock thickness	39.34	85	0.662
				10 o' clock thickness	62.3	85	0.757
				11 o' clock thickness	63.93	85	0.792
				12 o' clock thickness	45.91	85	0.765
				Average RNFL thickness	57.38	95	0.829
				Superior quadrant RNFL thickness	49.15	95	0.809
				Inferior quadrant RNFL thickness	59.02	95	0.795
				Nasal quadrant RNFL thickness	32.79	95	0.752
				Temporal quadrant RNFL thickness	44.26	95	0.768
				Superior hemisphere RNFL thickness	49.15	95	0.809
				1 o' clock thickness	40.98	95	0.762
				2 o' clock thickness	37.7	95	0.735

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				3 o' clock thickness	19.67	95	0.697
				4 o' clock thickness	22.95	95	0.709
				5 o' clock thickness	37.7	95	0.735
				6 o' clock thickness	50.82	95	0.757
				7 o' clock thickness	55.74	95	0.818
				8 o' clock thickness	34.43	95	0.799
				9 o' clock thickness	33.79	95	0.662
				10 o' clock thickness	44.26	95	0.757
				11 o' clock thickness	42.62	95	0.792
				12 o' clock thickness	36.07	95	0.765
[16] Bozkurt, B 2010	Healthy Controls Suspects Glaucoma	184 NR 158	HRT-3	Disc Area	0.28	90	0.66
				Rim area	54	90	0.76
				Rim volume	48	90	0.76
				Cup area	63	90	0.83
				Cup volume	50	90	0.8
				Cup shape measure	52	90	0.81
				Mean cup depth	45	90	0.77
				Maximum cup depth	22	90	0.67
				Height variation contour	28	90	0.61
				Mean RNFL thickness	38	90	0.74
				Vertical cup-disc ratio	66	0.9	0.85
				Cup-disc area ration	66	90	0.85
				Rim-disc area ratio	66	90	0.85

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				GPS global	66	90	0.86
[17] Saito, H 2009	Healthy Controls Suspects Glaucoma	2182 (2182) NR 66 (66)	HRT-2	MRA global	39.4	96.1	NR
				GPS global	65.2	83	NR
				FSM discriminant	59.1	86.7	NR
				MRA global	71.2	84.3	NR
				GPS global	87.9	58.4	NR
[18] Sehi, M 2009	Healthy Controls Glaucoma pts	50 (50) 50 (50)	RTVue OCT	Average RNFL thickness	80	90	0.88
				Superior quadrant RNFL thickness	58	90	0.8
				Inferior quadrant RNFL thickness	94	90	0.94
				Nasal quadrant RNFL thickness	48	90	0.74
				Temporal quadrant RNFL thickness	38	90	0.69
			Stratus OCT	Average RNFL thickness	80	90	0.87
				Superior quadrant RNFL thickness	58	90	0.79
				Inferior quadrant RNFL thickness	92	90	0.95
				Nasal quadrant RNFL thickness	36	90	0.76
				Temporal quadrant RNFL thickness	30	90	0.68
[63] Reddy, S 2009	Healthy Controls Glaucoma pts	142 (142) 247 (247)	HRT-3	MRA global	81.38	92.96	0.872
				GPS global	77.73	92.25	0.915
[19] Yuksel, N 2009	Healthy Controls Glaucoma	81 68	Stratus OCT	Average RNFL thickness	NR	NR	0.74
				Superior quadrant RNFL thickness	NR	NR	0.68
				Cup area	NR	NR	0.83
				Cup-disc area ratio	NR	NR	0.82
				VIRA	NR	NR	0.82

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
[20] Sung, K. R 2009	Healthy Controls Suspects Glaucoma pts	60 NR NR	Cirrus OCT	Average RNFL thickness	63.6	100	NR
			Stratus OCT	Average RNFL thickness	40	96.7	NR
[21] Oddone, F 2009	Healthy Controls Glaucoma	137 (137) 96 (96)	HRT-3	Rim area	NR	NR	0.69
				Rim volume	NR	NR	0.69
				Cup shape measure	NR	NR	0.75
				Mean RNFL thickness	NR	NR	0.71
				Cup-disc area ratio	NR	NR	0.7
				Rim-disc area ratio	NR	NR	0.7
				MRA overall	79	55	NR
				MRA global	56	72	NR
				MRA nasal Inferior	61	73	NR
				MRA nasal Superior	48	77	NR
				MRA nasal	45	76	NR
				MRA temporal	35	88	NR
				MRA temporal Superior	53	84	NR
				GPS global	83	40	NR
				GPS temporal Inferior	84	41	NR
				GPS temporal Superior	82	42	NR
				GPS nasal Inferior	83	40	NR
				GPS nasal Superior	83	40	NR
				GPS temporal	82	42	NR
				MRA overall	68	72	NR
				MRA global	42	89	NR
				MRA temporal Superior	35	93	NR
				MRA nasal Inferior	50	85	NR
				MRA nasal Superior	36	91	NR
				MRA temporal	18	96	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				MRA nasal	33	85	NR
				GPS global	65	69	NR
				GPS temporal Inferior	63	73	NR
				GPS temporal Superior	61	73	NR
				GPS nasal Inferior	63	74	NR
				GPS nasal Superior	59	73	NR
				GPS temporal	63	70	NR
[22] Takmaz, T 2009	Healthy Controls Glaucoma	80 (80) 80 (80)	HRT-3	MRA global	83.8	73.8	NR
				GPS overall	88.8	70	NR
				MRA global	72.5	93.8	NR
				GPS overall	75	88.8	NR
[64] Ng, M 2009	Healthy Controls Glaucoma	289 (289) 286 (286)	HFA SWAP-FT	Mean deviation (MD)	43.7	80.3	0.634
				Pattern standard deviation (PSD)	53.2	80.3	0.715
				Mean deviation (MD)	32.5	90.3	NR
				Pattern standard deviation (PSD)	41.6	90.3	NR
				Mean deviation (MD)	24.5	95.2	NR
				Pattern standard deviation (PSD)	36.7	95.2	NR
				Mean deviation (MD)	45.8	80.3	0.658
				Pattern standard deviation (PSD)	52.8	80.3	0.722
				Mean deviation (MD)	33.9	90.3	NR
				Pattern standard deviation (PSD)	44.1	90.3	NR
				Mean deviation (MD)	25.9	95.2	NR
				Pattern standard deviation (PSD)	32.9	95.2	NR
[23] Tafreshi, A 2009	Healthy Controls Glaucoma	164 (164) 174(174)	FDT 24-2	Mean deviation (MD)	39	90	0.714
				Pattern standard deviation (PSD)	34	90	0.685
				Mean deviation (MD)	32	95	0.714
				Pattern standard deviation (PSD)	28	95	0.685
				Mean deviation (MD)	37	90	0.674

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
			HFA SAP-SITA	Pattern standard deviation (PSD)	37	90	0.692
				Mean deviation (MD)	22	95	0.674
				Pattern standard deviation (PSD)	30	95	0.692
			HFA SWAP-SITA	Mean deviation (MD)	35	90	0.662
				Pattern standard deviation (PSD)	37	90	0.693
				Mean deviation (MD)	28	95	0.662
				Pattern standard deviation (PSD)	29	95	0.693
[65] Polo, V 2009	Healthy Controls Glaucoma	98(98) 66(66)	Stratus OCT	Average RNFL thickness	71.7	96.9	NR
				Superior hemisphere RNFL thickness	62.1	96.9	NR
				Inferior hemisphere RNFL thickness	59.1	96.9	NR
				Smax/ Imax	21.8	89.7	NR
				Imax/Smax	24.2	96.9	NR
				Imax/TAverage	16.6	94.9	NR
				Smax/NAverage	9.1	92.8	NR
				Smax/TAverage	10.6	91.8	NR
				Smax	65.1	89.7	NR
				Imax	60.6	94.9	NR
				Max-min	46.9	94.9	NR
				Average RNFL thickness	53	100	NR
				Superior hemisphere RNFL thickness	45.4	98.9	NR
				Inferior hemisphere RNFL thickness	37.8	100	NR
				Smax/ Imax	13.6	93.7	NR
				Imax/Smax	13.6	98.9	NR
				Imax/TAverage	9.1	100	NR
				Smax/NAverage	6.1	95.9	NR
				Smax/TAverage	6.1	98.9	NR
				Smax	45.4	95.9	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Imax	45.4	100	NR
				Max-min	30.3	97.9	NR
[71] Lu, A. T 2008	Healthy Controls Glaucoma	(89) (89)	Stratus OCT	Average RNFL thickness	NR	NR	0.89
				Superior quadrant RNFL thickness	NR	NR	0.857
				Inferior quadrant RNFL thickness	NR	NR	0.882
				Nasal quadrant RNFL thickness	NR	NR	0.727
				Temporal quadrant RNFL thickness	NR	NR	0.631
				1 o' clock thickness	NR	NR	0.754
				2 o' clock thickness	NR	NR	0.703
				3 o' clock thickness	NR	NR	0.694
				4 o' clock thickness	NR	NR	0.712
				5 o' clock thickness	NR	NR	0.791
				6 o' clock thickness	NR	NR	0.853
				7 o' clock thickness	NR	NR	0.829
				8 o' clock thickness	NR	NR	0.667
				9 o' clock thickness	NR	NR	0.534
				10 o' clock thickness	NR	NR	0.649
				11 o' clock thickness	NR	NR	0.823
				12 o' clock thickness	NR	NR	0.82
[66] Nouri-Mahdavi, K 2008	Healthy Controls Glaucoma	30 30	Stratus OCT	Average RNFL thickness	39	80	0.73
				Superior quadrant RNFL thickness	51	80	0.75
				Inferior quadrant RNFL thickness	46	80	0.71
				Nasal quadrant RNFL thickness	29	80	0.6
				Temporal quadrant RNFL thickness	18	80	0.62
				1 o' clock thickness	42	80	0.67
				2 o' clock thickness	24	80	0.6

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				3 o' clock thickness	35	80	0.56
				4 o' clock thickness	21	80	0.59
				5 o' clock thickness	32	80	0.64
				6 o' clock thickness	42	80	0.68
				7 o' clock thickness	36	80	0.71
				8 o' clock thickness	32	80	0.61
				9 o' clock thickness	17	80	0.5
				10 o' clock thickness	24	80	0.61
				11 o' clock thickness	38	80	0.69
				12 o' clock thickness	42	80	0.72
				Average RNFL thickness	24	90	0.73
				Superior quadrant RNFL thickness	36	90	0.75
				Inferior quadrant RNFL thickness	36	90	0.71
				Nasal quadrant RNFL thickness	17	90	0.6
				Temporal quadrant RNFL thickness	2	90	0.62
				1 o' clock thickness	27	90	0.67
				2 o' clock thickness	15	90	0.6
				3 o' clock thickness	12	90	0.56
				4 o' clock thickness	15	90	0.59
				5 o' clock thickness	24	90	0.64
				6 o' clock thickness	34	90	0.68
				7 o' clock thickness	12	90	0.71
				8 o' clock thickness	12	90	0.61

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				9 o' clock thickness	17	90	0.5
				10 o' clock thickness	2	90	0.61
				11 o' clock thickness	12	90	0.69
				12 o' clock thickness	39	90	0.72
				Average RNFL thickness	87	80	0.93
				Superior quadrant RNFL thickness	73	80	0.86
				Inferior quadrant RNFL thickness	90	80	0.94
				Nasal quadrant RNFL thickness	33	80	0.68
				Temporal quadrant RNFL thickness	70	80	0.78
				1 o' clock thickness	63	80	0.81
				2 o' clock thickness	37	80	0.69
				3 o' clock thickness	17	80	0.62
				4 o' clock thickness	50	80	0.69
				5 o' clock thickness	67	80	0.81
				6 o' clock thickness	80	80	0.9
				7 o' clock thickness	83	80	0.9
				8 o' clock thickness	73	80	0.81
				9 o' clock thickness	50	80	0.64
				10 o' clock thickness	67	80	0.75
				11 o' clock thickness	80	80	0.86
				12 o' clock thickness	63	80	0.81
				Average RNFL thickness	80	90	0.93
				Superior quadrant RNFL thickness	67	90	0.86

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Inferior quadrant RNFL thickness	87	90	0.94
				Nasal quadrant RNFL thickness	17	90	0.68
				Temporal quadrant RNFL thickness	53	90	0.78
				1 o' clock thickness	53	90	0.81
				2 o' clock thickness	23	90	0.69
				3 o' clock thickness	13	90	0.62
				4 o' clock thickness	40	90	0.69
				5 o' clock thickness	60	90	0.81
				6 o' clock thickness	63	90	0.9
				7 o' clock thickness	83	90	0.9
				8 o' clock thickness	57	90	0.81
				9 o' clock thickness	27	90	0.64
				10 o' clock thickness	57	90	0.75
				11 o' clock thickness	70	90	0.86
				12 o' clock thickness	47	90	0.81
[24] Chen, H. Y 2008	Healthy Controls POAG	45(45) 47(47)	GDX-VCC	TNSIT average	57.4	100	750.5
				Superior RNFL average	61.7	100	760.8
				Inferior RNFL average	76.6	71.1	760.2
				TSNIT standard deviation	42.6	95.6	630.9
				NFI (Nerve fiber layer index)	57.4	100	770.9
				Normalized Inferior	68.1	73.3	730.1
				Normalized Superior	57.4	95.6	770.2
				Ellipse modulation	44.7	68.9	510.5
				Superior maximum	46.8	100	710.9
				Superior ratio	48.9	53.3	590.2
				Inferior maximum	48.9	93.3	650.3
				Inferior ratio	48.9	68.9	530.2
				Maximum modulation	27.6	68.7	540.7
[25]	Healthy Controls	81 (81)		Mean deviation (MD)	46	80	0.680

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
Racette, L 2008	Glaucoma	85 (85)	SAP-SITA	Pattern standard deviation (PSD)	45	80	0.641
			FDT N30	Mean deviation (MD)	44	80	0.660
				Pattern standard deviation (PSD)	56	80	0.733
			FDT 24-2	Mean deviation (MD)	55	80	0.763
				Pattern standard deviation (PSD)	56	80	0.755
[26] Takahashi, H 2008	Healthy Controls Glaucoma	45 (45) 47(47)	GDX-VCC	TSNIT average	78	82	0.872
				Superior RNFL average	76	82	0.870
				Inferior RNFL average	91	82	0.928
				NFI	92	86	0.935
				TSNIT average	72	93	0.872
				Superior RNFL average	67	93	0.870
				Inferior RNFL average	75	93	0.928
				NFI	86	91	0.936
				TSNIT average	75	83	0.865
				Superior RNFL average	74	83	0.851
				Inferior RNFL average	81	83	0.890
				NFI	86	86	0.912
				TSNIT average	69	92	0.865
				Superior RNFL average	65	92	0.851
				Inferior RNFL average	72	92	0.890
				NFI	80	92	0.912
			Stratus OCT	Average RNFL thickness	82	86	0.868
				Superior quadrant RNFL thickness	78	82	0.822
				Inferior quadrant RNFL thickness	91	86	0.921
				Average RNFL thickness	71	93	0.868
				Superior quadrant RNFL thickness	65	93	0.822
				Inferior quadrant RNFL thickness	82	93	0.921
				Average RNFL thickness	78	82	0.851
				Superior quadrant RNFL thickness	75	82	0.846
				Inferior quadrant RNFL thickness	85	82	0.902
				Average RNFL thickness	70	92	0.851
				Superior quadrant RNFL thickness	64	92	0.846

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Inferior quadrant RNFL thickness	78	92	0.902
[72] Medeiros, F. A 2008	Healthy Controls Suspects Glaucoma pts	42 92 40	GDX-VCC	TSNIT average	48	95	0.78
				Superior RNFL average	40	95	0.77
				Inferior RNFL average	20	95	0.72
				TSNIT standard deviation	23	95	0.66
				NFI (Nerve fiber layer index)	50	95	0.83
				TSNIT average	75	71	NR
				Superior RNFL average	68	71	NR
				Inferior RNFL average	65	71	NR
				TSNIT standard deviation	43	71	NR
				NFI (Nerve fiber layer index)	83	70	NR
			HRT-2	Disc area	0	95	0.52
				Rim area	23	98	0.69
				Rim volume	35	95	0.70
				Cup area	3	95	0.65
				Cup volume	0	95	0.63
				Cup shape measure	8	95	0.60
				Linear cup disc ratio	10	95	0.69
				Mean cup depth	3	98	0.59
				Maximum cup depth	8	95	0.58
				Height variation contour	23	98	0.60
				Mean height contour	10	95	0.55
				Mean RNFL thickness	35	95	0.69
				RNFL cross sectional area	28	95	0.69
				Cup/Disc area ratio	10	95	0.68
				Rim/Disc area ratio	10	98	0.69
				GPS Value	8	98	0.68
				Mikelberg (FSM) Discriminant Function	15	95	0.67
				Disc area	28	70	NR
				Rim area	58	70	NR
				Rim volume	63	70	NR
				Cup area	45	70	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Cup volume	40	70	NR
				Cup shape measure	45	72	NR
				Linear cup disc ratio	58	70	NR
				Mean cup depth	40	70	NR
				Maximum cup depth	40	70	NR
				Height variation contour	43	71	NR
				Mean height contour	28	70	NR
				Mean RNFL thickness	53	76	NR
				RNFL cross sectional area	65	70	NR
				Cup/Disc area ratio	50	70	NR
				Rim/Disc area ratio	50	70	NR
				GPS Value	53	70	NR
				Mikelberg (FSM) Discriminant Function	50	70	NR
[27] Ferreras, A 2008	Healthy controls Suspects	(93) (90)	HRT-2	Disc area	15.5	95	0.663
				Rim area	47.7	95	0.845
				Rim volume	44.4	95	0.859
				Cup area	52.2	95	0.890
				Cup volume	34.4	95	0.833
				Cup shape measure	56.6	95	0.846
				Linear cup-disc ratio	30	95	0.728
				Mean cup depth	3.3	95	0.568
				Maximum cup depth	13.3	95	0.642
				Height variation contour	31.1	95	0.849
				Mean RNFL thickness	32.2	95	0.832
				RNFL cross-sectional area	73.3	95	0.914
				Vertical cup-disc ratio	67.7	95	0.906
				Cup-disc area ratio	67.7	95	0.906
				Rim-disc area ratio	65.5	95	0.890
				FSM discriminant	55.5	95	0.768
				Contour line modulation (CLM) temporal-Inferior	26.6	95	0.739
				Reference height	0	95	0.508
				RB discriminant	74.4	95	0.886

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Disc area	18.8	95	0.649
				Rim area	48.3	95	0.889
				Rim volume	57.7	95	0.904
				Cup area	58.8	95	0.916
				Cup volume	38.8	95	0.845
				Cup shape measure	58.8	95	0.896
				Linear cup-disc ratio	66.6	95	0.928
				Mean cup depth	28.8	95	0.738
				Maximum cup depth	3.3	95	0.558
				Height variation contour	11.1	95	0.656
				Mean RNFL thickness	37.7	95	0.851
				RNFL cross-sectional area	28.8	95	0.834
				Cup-disc area ratio	65.5	95	0.941
				Rim-disc area ratio	83.3	95	0.948
				FSM discriminant	45.5	95	0.734
				Contour line modulation (CLM) temporal-Inferior	36.6	95	0.820
				Reference height	3.3	95	0.516
				RB discriminant	71.1	95	0.927
[28] Parikh, R. S 2008	Healthy controls Glaucoma	104 (104) 74 (74)	GDX-VCC	TSNIT average	65.3	89.4	0.83
				Superior RNFL average	66.7	90.4	NR
				Inferior RNFL average	65.3	84.6	NR
				TSNIT standard deviation	61.3	95.2	0.87
				Inter-Eye symmetry	66.7	84.6	NR
				NFI	90.5	52.9	0.85
				NFI	71.6	87.5	NR
				NFI	59.5	97.1	NR
				NFI	52.7	99	NR
[29] Moreno-Montanes, J 2008	Healthy controls Suspects Glaucoma	(54) (40) (83)	HRT-3	MRA global	39.8	93.2	NR
				MRA temporal Inferior	47	93.2	NR
				MRA temporal Superior	32.5	100	NR
				MRA nasal Inferior	55.4	93.2	NR
				MRA nasal Superior	37.3	91.5	NR
				MRA nasal	34.9	89.8	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				MRA temporal	20.5	100	NR
				GPS global	71.5	69.5	0.77
				GPS temporal Inferior	69.9	74.6	0.78
				GPS temporal Superior	60.2	78	0.79
				GPS nasal Inferior	68.7	74.6	0.78
				GPS nasal Superior	67.5	71.2	0.78
				GPS temporal	69.9	71.2	0.78
				MRA global	68.7	83.1	NR
				MRA temporal Inferior	61.4	84.7	NR
				MRA temporal Superior	56.1	88.1	NR
				MRA nasal Inferior	68.7	86.4	NR
				MRA nasal Superior	60.2	86.4	NR
				MRA nasal	53	84.7	NR
				MRA temporal	38.6	96.6	NR
				GPS global	85.5	54.2	NR
				GPS temporal Superior	77.1	71.2	NR
				GPS temporal Inferior	80.7	59.3	NR
				GPS nasal Inferior	81.9	55.9	NR
				GPS nasal Superior	83.1	59.3	NR
				GPS temporal	81.9	55.9	NR
[67] Badala, F 2007	Healthy Controls Glaucoma	(46) (46)	GDX-VCC	TSNIT average	80	80	0.83
				Superior RNFL average	85	80	0.88
				Inferior RNFL average	76	80	0.84
				TSNIT standard deviation	67	80	0.85
				NFI	89	80	0.92
				TSNIT average	63	95	NR
				Superior RNFL average	54	95	NR
				Inferior RNFL average	59	95	NR
				TSNIT standard deviation	54	95	NR
				NFI	78	95	NR
			HRT-3	Disc area	22	80	0.54
				Rim area	83	80	0.89
				Rim volume	83	80	0.84

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Cup area	80	80	NR
				Cup volume	80	80	0.85
				Cup shape measure	83	80	0.87
				Mean cup depth	74	80	0.82
				Maximum cup depth	48	80	0.72
				Height variation contour	41	80	0.5
				Mean RNFL thickness	80	80	0.83
				RNFL cross-sectional area	76	80	0.8
				Vertical cup- disc ratio	89	80	0.90
				Horizontal cup-disc ratio	70	80	0.82
				Cup-disc area ratio	83	80	0.91
				Rim-disc area ratio	83	80	0.91
				FSM discriminant	87	80	0.91
				Contour line modulation (CLM) temporal-Inferior	63	80	0.79
				Contour line modulation (CLM) temporal-Superior	43	80	0.63
				Reference height	24	80	0.56
				RB discriminant	85	80	0.86
				Disc area	9	95	NR
				Rim area	50	95	NR
				Rim volume	61	95	NR
				Cup area	50	95	NR
				Cup volume	50	95	NR
				Cup shape measure	33	95	NR
				Mean cup depth	33	95	NR
				Maximum cup depth	28	95	NR
				Height variation contour	26	95	NR
				Mean RNFL thickness	50	95	NR
				RNFL cross-sectional area	37	95	NR
				Vertical cup- disc ratio	67	95	NR
				Horizontal cup- disc ratio	38	95	NR
				Cup-disc area ratio	67	95	NR
				Rim-disc area ratio	67	95	NR
				FSM discriminant	70	95	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Contour line modulation (CLM) temporal-Inferior	43	95	NR
				Contour line modulation (CLM) temporal-Superior	17	95	NR
				Reference height	4	95	NR
				RB discriminant	70	95	NR
			Stratus OCT	Average RNFL thickness	96	80	0.96
				Superior quadrant RNFL thickness	91	80	0.92
				Inferior quadrant RNFL thickness	91	80	0.95
				Nasal quadrant RNFL thickness	52	80	0.74
				Temporal quadrant RNFL thickness	72	80	0.79
				Superior hemisphere RNFL thickness	72	80	0.85
				Inferior hemisphere RNFL thickness	87	80	0.90
				1 o' clock thickness	76	80	0.85
				2 o' clock thickness	57	80	0.78
				3 o' clock thickness	35	80	0.66
				4 o' clock thickness	44	80	0.66
				5 o' clock thickness	70	80	0.83
				6 o' clock thickness	85	80	0.92
				7 o' clock thickness	89	80	0.93
				8 o' clock thickness	63	80	0.83
				9 o' clock thickness	54	80	0.69
				10 o' clock thickness	65	80	0.73
				11 o' clock thickness	87	80	0.86
				12 o' clock thickness	72	80	0.85
				Smax/ Imax	50	80	0.66
				Imax/Smax	50	80	0.66
				Imax/TAverage	54	80	0.64
				Smax/NAverage	44	80	0.64
				Smax/TAverage	33	80	0.54
				Smax	85	80	0.91
				Imax	89	80	0.93
				Max-min	78	80	0.88
				Cup-disc Horizontal ratio	70	80	0.82
				Average RNFL thickness	89	95	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Superior quadrant RNFL thickness	54	95	NR
				Inferior quadrant RNFL thickness	87	95	NR
				Nasal quadrant RNFL thickness	35	95	NR
				Temporal quadrant RNFL thickness	30	95	NR
				Superior hemisphere RNFL thickness	50	95	NR
				Inferior hemisphere RNFL thickness	72	95	NR
				1 o' clock thickness	28	95	NR
				2 o' clock thickness	37	95	NR
				3 o' clock thickness	20	95	NR
				4 o' clock thickness	22	95	NR
				5 o' clock thickness	57	95	NR
				6 o' clock thickness	74	95	NR
				7 o' clock thickness	78	95	NR
				8 o' clock thickness	35	95	NR
				9 o' clock thickness	33	95	NR
				10 o' clock thickness	33	95	NR
				11 o' clock thickness	35	95	NR
				12 o' clock thickness	46	95	NR
				Smax/ Imax	35	95	NR
				Imax/Smax	35	95	NR
				Imax/TAverage	41	95	NR
				Smax/NAverage	26	95	NR
				Smax/TAverage	20	95	NR
				Smax	57	95	NR
				Imax	78	95	NR
				Max-min	65	95	NR
				Cup-disc Horizontal ratio	38	95	NR
[68] De Leon-Ortega, J. E 2007	Healthy controls Glaucoma	89 78	HRT-2	Vertical cup-disc ratio	44.9	95	0.843
				MRA overall	62	92	NR
			HRT-3	Vertical cup-disc ratio	53.9	95	0.854
				MRA overall	77	83	NR
				GPS overall	71	73	NR
				GPS temporal	44.0	95	0.813

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
[69] Medeiros, F. A 2007	Healthy controls Glaucoma	94 (55) 102 (68)	GDX-ECC	TSNIT average	NR	NR	0.930
				Superior RNFL average	NR	NR	0.884
				Inferior RNFL average	NR	NR	0.918
				TSNIT standard deviation	NR	NR	0.816
				NFI	NR	NR	0.944
			GDX-VCC	TSNIT average	NR	NR	0.751
				Superior RNFL average	NR	NR	0.821
				Inferior RNFL average	NR	NR	0.792
				TSNIT standard deviation	NR	NR	0.881
				NFI	NR	NR	0.920
[30] Naithani, P 2007	Healthy controls Glaucoma	60 (60) 30 (30)	HRT-2	Disc area	NR	NR	0.474
				Rim area	NR	NR	0.843
				Cup area	NR	NR	0.758
				Cup volume	NR	NR	0.787
				Cup shape measure	NR	NR	0.814
				Vertical cup- disc ratio	NR	NR	0.852
				Horizontal cup-disc ratio	NR	NR	0.776
				Cup-disc area ratio	NR	NR	0.819
				Rim-disc area ratio	NR	NR	0.819
				MRA overall	NR	NR	0.755
				FSM discriminant	NR	NR	0.826
				RB discriminant	NR	NR	0.84
				Disc area	NR	NR	0.587
				Rim area	NR	NR	0.829
				Cup area	NR	NR	0.535
				Cup volume	NR	NR	0.815
				Cup shape measure	NR	NR	0.863
				Vertical cup- disc ratio	NR	NR	0.894
				Horizontal cup-disc ratio	NR	NR	0.864
				Cup-disc area ratio	NR	NR	0.872
				Rim-disc area ratio	NR	NR	0.872
				MRA overall	NR	NR	0.788

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				FSM discriminant	NR	NR	0.892
				RB discriminant	NR	NR	0.843
			Stratus OCT	Average RNFL thickness	NR	NR	0.937
				Superior quadrant RNFL thickness	NR	NR	0.897
				Inferior quadrant RNFL thickness	NR	NR	0.907
				Nasal quadrant RNFL thickness	NR	NR	0.818
				Temporal quadrant RNFL thickness	NR	NR	0.88
				Superior hemisphere RNFL thickness	NR	NR	0.894
				Inferior hemisphere RNFL thickness	NR	NR	0.906
				1 o' clock thickness	NR	NR	0.881
				2 o' clock thickness	NR	NR	0.836
				3 o' clock thickness	NR	NR	0.757
				4 o' clock thickness	NR	NR	0.751
				5 o' clock thickness	NR	NR	0.806
				6 o' clock thickness	NR	NR	0.877
				7 o' clock thickness	NR	NR	0.809
				8 o' clock thickness	NR	NR	0.817
				9 o' clock thickness	NR	NR	0.888
				10 o' clock thickness	NR	NR	0.828
				11 o' clock thickness	NR	NR	0.824
				12 o' clock thickness	NR	NR	0.829
				Disc area	NR	NR	0.532
				Cup area	NR	NR	0.824
				Rim area	NR	NR	0.907
				Cup-disc area ratio	NR	NR	0.893
				Horizontal cup-disc ratio	NR	NR	0.849
				Vertical cup-disc ratio	NR	NR	0.911
				VIRA	NR	NR	0.86
				HIRW	NR	NR	0.863
				Average RNFL thickness	NR	NR	0.953
				Superior quadrant RNFL thickness	NR	NR	0.957
				Inferior quadrant RNFL thickness	NR	NR	0.954
				Nasal quadrant RNFL thickness	NR	NR	0.821
				Temporal quadrant RNFL thickness	NR	NR	0.948
				Superior hemisphere RNFL thickness	NR	NR	0.955

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Inferior hemisphere RNFL thickness	NR	NR	0.95
				1 o' clock thickness	NR	NR	0.923
				2 o' clock thickness	NR	NR	0.836
				3 o' clock thickness	NR	NR	0.751
				4 o' clock thickness	NR	NR	0.759
				5 o' clock thickness	NR	NR	0.842
				6 o' clock thickness	NR	NR	0.915
				7 o' clock thickness	NR	NR	0.889
				8 o' clock thickness	NR	NR	0.926
				9 o' clock thickness	NR	NR	0.938
				10 o' clock thickness	NR	NR	0.921
				11 o' clock thickness	NR	NR	0.851
				12 o' clock thickness	NR	NR	0.864
				Disc area	NR	NR	0.635
				Cup area	NR	NR	0.547
				Rim area	NR	NR	0.921
				Cup-disc area ratio	NR	NR	0.93
				Horizontal cup-disc ratio	NR	NR	0.885
				Vertical cup- disc ratio	NR	NR	0.951
				VIRA	NR	NR	0.894
				HIRW	NR	NR	0.939
[31] Pueyo, V 2007	Healthy controls Glaucoma	66 (66) 73 (73)	HRT-2	MRA global	95.5	85	0.902
				FSM discriminant	95.5	73	0.899
				RB discriminant	95.5	66	0.877
			Stratus OCT	Average RNFL thickness	95.5	66	0.912
			GDX-VCC	TSNIT standard deviation	95.5	51	0.808
				NFI	95.5	48	0.878
[32] Sehi, M 2007	Healthy controls Glaucoma	95(95) 63(63)	GDX-ECC	TSNIT average	81	80	NR
				Superior RNFL average	76	80	NR
				Inferior RNFL average	67	80	NR
				TSNIT standard deviation	79	80	NR
				TSNIT average	54	95	0.81
				Superior RNFL average	48	95	0.73
				Inferior RNFL average	41	95	0.67
				TSNIT standard deviation	14	95	0.80

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
			GDX-VCC	TSNIT average	56	95	0.87
				Superior RNFL average	49	95	0.83
				Inferior RNFL average	54	95	0.85
				TSNIT standard deviation	33	95	0.84
				TSNIT average	67	80	NR
				Superior RNFL average	57	80	NR
				Inferior RNFL average	56	80	NR
				TSNIT standard deviation	73	80	NR
			Stratus OCT	Average RNFL thickness	68	95	0.90
				Superior quadrant RNFL thickness	38	95	0.84
				Inferior quadrant RNFL thickness	67	95	0.91
				Nasal quadrant RNFL thickness	57	95	0.79
				Temporal quadrant RNFL thickness	41	95	0.66
[73] Mai, T. A 2007	Healthy controls Glaucoma	82 (41) 184 (92)	GDX-ECC	TSNIT average	90	95	0.98
				Superior RNFL average	87	95	0.98
				Inferior RNFL average	65	95	0.93
				TSNIT standard deviation	77	95	0.97
				NFI	95	95	0.986
			GDX-VCC	TSNIT average	74	95	0.89
				Superior RNFL average	87	95	0.95
				Inferior RNFL average	52	95	0.83
				TSNIT standard deviation	58	95	0.92
				NFI	98	95	0.993
[33] Ferreras, 2007	Healthy controls Glaucoma	71(71 115(115)	HRT-3	Rim area	60.0	60.0	NR
				Rim volume	61.4	52.9	NR
				Cup area	67.1	62.9	NR
				Cup volume	64.3	67.1	NR
				Cup shape measure	67.1	71.4	NR
				Linear cup-disc ratio	74.3	64.3	NR
				Mean cup depth	71.4	67.1	NR
				Maximum cup depth	67.1	57.1	NR
				Height variation contour	55.7	54.3	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Mean RNFL thickness	52.9	47.1	NR
				RNFL cross-sectional area	47.1	50.0	NR
				Cup-disc area ratio	70.0	68.6	NR
[34] Hong, S 2007	Healthy controls Glaucoma	56(56) 65(65)	FDT 30-2	Mean deviation/defect (MD)	NR	NR	0.795
				Pattern standard deviation (PSD)	NR	NR	0.808
				Glaucoma Hemifield Test (GHT) Outside Normal	NR	NR	0.689
[35] Uysal, Y 2007	Healthy controls Glaucoma	70(70) 70(70)	HRT 2	Rim area	NR	NR	0.839
				Rim volume	NR	NR	0.825
				Cup shape measure	NR	NR	0.871
				Linear cup-disc ratio	NR	NR	0.897
				Height variation contour	NR	NR	0.615
				Mean RNFL thickness	NR	NR	0.790
				MRA overall	NR	NR	0.934
				MRA global	NR	NR	0.815
				MRA temporal Inferior	NR	NR	0.846
				MRA temporal Superior	NR	NR	0.731
				MRA nasal Inferior	NR	NR	0.843
				MRA nasal Superior	NR	NR	0.755
				MRA nasal	NR	NR	0.730
				MRA temporal	NR	NR	0.686
				GPS Overall	NR	NR	0.880
				GPS Global	NR	NR	0.862
				GPS temporal Inferior	NR	NR	0.907
				GPS temporal Superior	NR	NR	0.900
				GPS nasal Inferior	NR	NR	0.843
				GPS nasal Superior	NR	NR	0.900
				GPS temporal	NR	NR	0.897
[74] Hong, S 2007	Healthy controls Glaucoma	48(48) 72(72)	GDX-VCC	TSNIT average	NR	NR	0.845
				Superior RNFL average	NR	NR	0.824

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Inferior RNFL average	NR	NR	0.782
				TSNIT standard deviation	NR	NR	0.796
				NFI	NR	NR	0.906
				Normalized Inferior	NR	NR	0.831
				Normalized Superior	NR	NR	0.801
				Ellipse average	NR	NR	0.845
				Ellipse SD	NR	NR	0.796
				Ellipse modulation	NR	NR	0.796
				Superior maximum	NR	NR	0.807
				Inferior maximum	NR	NR	0.816
			FDT 30-2	Mean deviation/defect (MD)	NR	NR	0.750
				Pattern standard deviation (PSD)	NR	NR	0.934
			RNFL Photos	Horizontal cup disc ratio	NR	NR	0.737
				Nerve Fiber Layer (NFL/RNFL)	NR	NR	0.751
			Stratus OCT	Average RNFL thickness	NR	NR	0.719
				Inferior quadrant RNFL thickness	NR	NR	0.794
				Superior hemisphere RNFL thickness	NR	NR	0.668
				Smax/Imax	NR	NR	0.698
				Imax/Smax	NR	NR	0.700
				Imax/TAverage	NR	NR	0.651
				Smax	NR	NR	0.613
				Max-min	NR	NR	0.645
				Disc area	NR	NR	0.547
				HIRW	NR	NR	0.547
[36] Leeprechanon, N 2007	Healthy controls Glaucoma	42(42) 50(50)	FDT 24-2	Mean deviation/defect (MD)	94	80	NR
				Pattern standard deviation (PSD)	96	80	NR
				Mean deviation/defect (MD)	87	90	NR
				Pattern standard deviation (PSD)	96	90	NR
				Mean deviation/defect (MD)	82	95	NR
				Pattern standard deviation (PSD)	90	95	NR
				Pattern standard deviation (PSD)	98	93	NR

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Glaucoma Hemifield Test (GHT) Outside Normal	92	98	NR
				Subjective/Quasi-objective assessment	98	86	NR
[37] Burgansky-Eliash, Z 2007	Healthy controls Glaucoma	71 50	HRT-2	MRA overall	58.1	84.5	0.75
				MRA global	NR	NR	0.69
				MRA temporal Inferior	NR	NR	0.74
				MRA temporal Superior	NR	NR	0.67
				MRA nasal Inferior	NR	NR	0.74
				MRA nasal Superior	NR	NR	NR
				MRA nasal	NR	NR	0.6
				MRA temporal	NR	NR	0.59
			HRT-3	MRA overall	NR	NR	0.927
				MRA global	NR	NR	0.769
				MRA temporal Inferior	NR	NR	0.843
				MRA temporal Superior	NR	NR	0.710
				MRA nasal Inferior	NR	NR	0.824
				MRA nasal Superior	NR	NR	0.731
				MRA nasal	NR	NR	0.669
				MRA temporal	58.1	84.5	0.620
[38] Brusini, P 2006	Healthy controls Glaucoma	62 95	GDX-VCC	TSNIT average	45.3	90	0.73
				Superior RNFL average	55.8	90	0.82
				Inferior RNFL average	42.1	90	0.75
				TSNIT standard deviation	56.8	90	0.78
				NFI	67.4	90	0.85
				Normalized Inferior	42.1	90	0.73
				Normalized Superior	64.2	90	0.84
				Ellipse modulation	46.3	90	0.77
				Superior maximum	46.3	90	0.74
				Superior ratio	57.9	90	0.78
				Inferior maximum	50.5	90	0.67
				Inferior ratio	53.7	90	0.74
				Maximum modulation	35.8	90	0.75
			Stratus OCT	Average RNFL thickness	65.3	90	0.74
				Superior quadrant RNFL thickness	61	90	0.83

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Inferior quadrant RNFL thickness	40	90	0.74
				Nasal quadrant RNFL thickness	27.4	90	0.71
				Temporal quadrant RNFL thickness	42.1	90	0.74
				Superior hemisphere RNFL thickness	63.1	90	0.83
				Inferior hemisphere RNFL thickness	53.7	90	0.78
				Max-min	46.3	90	0.74
				Cup area	64.2	90	0.82
				Rim area	51.6	90	0.81
				Cup-disc area ratio	71.6	90	0.88
				Horizontal cup-disc ratio	60	90	0.81
				Vertical cup- disc ratio	63.1	90	0.84
				VIRA	68.4	90	0.86
				HIRW	67.4	90	0.87
[39] Shah, N. N 2006	Healthy controls Glaucoma	49 (49) 65 (65)	GDX-VCC	TSNIT average	NR	NR	0.84
				Superior RNFL average	NR	NR	0.83
				Inferior RNFL average	NR	NR	0.83
				TSNIT standard deviation	NR	NR	0.86
				NFI	41.9	98.3	0.90
				Normalized Inferior	NR	NR	0.85
				Normalized Superior	NR	NR	0.84
				Superior maximum	NR	NR	0.83
				Superior ratio	NR	NR	0.79
				Inferior maximum	NR	NR	0.78
				Inferior ratio	NR	NR	0.76
				TSNIT average	NR	NR	0.75
				Superior RNFL average	NR	NR	0.76
				Inferior RNFL average	NR	NR	0.72
				TSNIT standard deviation	NR	NR	0.77
				NFI	27.7	100	0.80
				Normalized Inferior	NR	NR	0.75
				Normalized Superior	NR	NR	0.76
				Superior maximum	NR	NR	0.79
				Superior ratio	NR	NR	0.77
				Inferior maximum	NR	NR	0.68
				Inferior ratio	NR	NR	0.73

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
			HRT-2	MRA overall	49.2	89.8	0.80
				MRA global	NR	NR	0.67
				MRA temporal Inferior	NR	NR	0.72
				MRA temporal Superior	NR	NR	0.66
				MRA nasal Inferior	NR	NR	0.75
				MRA nasal Superior	NR	NR	0.65
				MRA nasal	NR	NR	0.65
				MRA temporal	NR	NR	0.61
			Stratus OCT	Average RNFL thickness	NR	NR	0.86
				Superior quadrant RNFL thickness	NR	NR	0.79
				Inferior quadrant RNFL thickness	58.1	98.3	0.88
				Nasal quadrant RNFL thickness	NR	NR	0.70
				Temporal quadrant RNFL thickness	NR	NR	0.67
				Average RNFL thickness	NR	NR	0.79
				Superior quadrant RNFL thickness	NR	NR	0.75
				Inferior quadrant RNFL thickness	33.9	98	0.77
				Nasal quadrant RNFL thickness	NR	NR	0.69
				Temporal quadrant RNFL thickness	NR	NR	0.59
[40] Sample, P. A 2006	Healthy controls Glaucoma	(51) (111)	HFA SAP-FT	Mean deviation/defect (MD)	NR	NR	0.755
				Pattern standard deviation (PSD)	NR	NR	0.77
				Mean deviation/defect (MD)	61	90	0.813
				Pattern standard deviation (PSD)	52	90	0.875
				Mean deviation/defect (MD)	74	80	NR
				Pattern standard deviation (PSD)	71	80	NR
			HFA SAP-FT	Mean deviation/defect (MD)	NR	NR	0.601
				Pattern standard deviation (PSD)	NR	NR	0.713
				Mean deviation/defect (MD)	55	90	0.731
				Pattern standard deviation (PSD)	48	90	0.762
				Mean deviation/defect (MD)	65	80	NR
				Pattern standard deviation (PSD)	50	80	NR
			HFA SWAP-FT	Mean deviation/defect (MD)	NR	NR	0.601
				Pattern standard deviation (PSD)	NR	NR	0.733
				Mean deviation/defect (MD)	29	90	0.587
				Pattern standard deviation (PSD)	45	90	0.775

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
[41] Pierre-Filho Pde, T 2006	Healthy controls Glaucoma	53 (53) 64 (64)	FDT N30	Mean deviation/defect (MD)	42	80	NR
				Pattern standard deviation (PSD)	48	80	NR
			FDT C20	Subjective/Quasi-objective assessment	85.9	73.6	NR
				Subjective/Quasi-objective assessment	82.8	83	NR
			HFA SITA-Fast	Pattern standard deviation (PSD)	92.2	69.8	NR
				Glaucoma Hemifield Test (GHT) Borderline	93.8	60.4	NR
				Subjective/Quasi-objective assessment	92.2	67.8	NR
			HFA SITA-Standard	Pattern standard deviation (PSD)	87.5	71.7	NR
				Glaucoma Hemifield Test (GHT) Borderline	89.1	66.0	NR
				Subjective/Quasi-objective assessment	89.1	66.0	NR
			Octopus 301 G1-TOP	Subjective/Quasi-objective assessment	87.5	56.6	NR
				Subjective/Quasi-objective assessment	89.1	62.3	NR
[42] Sihota, R 2006	Healthy controls Glaucoma	160 61	Stratus OCT	Average RNFL thickness	NR	NR	0.905
				Superior quadrant RNFL thickness	NR	NR	0.856
				Inferior quadrant RNFL thickness	NR	NR	0.862
				Nasal quadrant RNFL thickness	NR	NR	0.808
				Temporal quadrant RNFL thickness	NR	NR	0.704
[43] Chen, H. Y 2005	Healthy controls Glaucoma	94 (94) 68 (68)	Stratus OCT	Average RNFL thickness	NR	NR	0.812
				Superior quadrant RNFL thickness	NR	NR	0.728
				Inferior quadrant RNFL thickness	NR	NR	0.793
				Nasal quadrant RNFL thickness	NR	NR	0.737
				Temporal quadrant RNFL thickness	NR	NR	0.535
				1 o' clock thickness	NR	NR	0.682
				2 o' clock thickness	NR	NR	0.719
				3 o' clock thickness	NR	NR	0.728
				4 o' clock thickness	NR	NR	0.716
				5 o' clock thickness	NR	NR	0.699
				6 o' clock thickness	NR	NR	0.701
				7 o' clock thickness	NR	NR	0.768
				8 o' clock thickness	NR	NR	0.542
				9 o' clock thickness	NR	NR	0.531
				10 o' clock thickness	NR	NR	0.537

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				11 o' clock thickness	NR	NR	0.701
				12 o' clock thickness	NR	NR	0.642
[70] Medeiros, F. A 2006	Healthy controls Glaucoma	61 (61) 105 (105)	GDX-VCC	TSNIT average	77	80	NR
				Superior RNFL average	79	80	NR
				Inferior RNFL average	72	80	NR
				TSNIT standard deviation	66	80	NR
				NFI	86	83	NR
			HRT-2	MRA overall	70	83	NR
				MRA global	42	97	NR
				MRA temporal Inferior	15	98	NR
				MRA temporal Superior	33	95	NR
				MRA nasal Inferior	47	93	NR
				MRA nasal Superior	44	92	NR
				MRA nasal	32	98	NR
			Stratus OCT	Average RNFL thickness	79	83	NR
				Superior quadrant RNFL thickness	69	80	NR
				Inferior quadrant RNFL thickness	79	83	NR
				Nasal quadrant RNFL thickness	47	80	NR
				Temporal quadrant RNFL thickness	39	83	NR
[44] Bagga, H 2006	Healthy controls Glaucoma	22 (22) 25 (25)	FDT 24-2	Mean deviation/defect (MD)	NR	NR	0.69
				Pattern standard deviation (PSD)	NR	NR	0.66
			GDX-VCC	TSNIT average	NR	NR	0.66
				Superior RNFL average	NR	NR	0.66
				Inferior RNFL average	NR	NR	0.67
				TSNIT standard deviation	NR	NR	0.65
				NFI	NR	NR	0.67
			Goldmann Tonometer	IOP	NR	NR	0.66
			HFA SWAP-FT	Mean deviation/defect (MD)	NR	NR	0.66
				Pattern standard deviation (PSD)	NR	NR	0.71
			Stratus OCT	Average RNFL thickness	NR	NR	0.71

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Superior quadrant RNFL thickness	NR	NR	0.81
				Inferior quadrant RNFL thickness	NR	NR	0.65
				Average macular thickness	NR	NR	0.71
[45] Kanamori, A 2006	Healthy controls Suspects	93 55	GDX-VCC	TSNIT average	NR	NR	0.895
				Superior RNFL average	NR	NR	0.869
	OHT Early Glaucoma	26 67		Inferior RNFL average	NR	NR	0.905
				TSNIT standard deviation	NR	NR	0.865
				Inter-eye symmetry	NR	NR	0.579
				NFI	NR	NR	0.912
				Normalized Inferior	NR	NR	0.899
				Normalized Superior	NR	NR	0.855
				Ellipse modulation	NR	NR	0.715
				Superior maximum	NR	NR	0.848
				Superior ratio	NR	NR	0.710
				Inferior maximum	NR	NR	0.889
				Inferior ratio	NR	NR	0.749
				Maximum modulation	NR	NR	0.810
[46] Da Pozzo, S 2005	Healthy Controls Glaucoma	65 (65) 59 (59	GDX-VCC	TSNIT average	84.7	80	0.897
				Superior RNFL average	84.7	80	0.877
				Inferior RNFL average	74.6	80	0.852
				TSNIT standard deviation	79.7	80	0.830
				NFI	89.8	80	0.938
				Normalized Inferior	74.6	80	0.850
				Normalized Superior	86.4	80	0.879
				Ellipse modulation	45.8	80	0.662
				Superior maximum	79.7	80	0.837
				Superior ratio	61.0	80	0.755
				Inferior maximum	66.1	80	0.811
				Inferior ratio	52.5	80	0.692
				Maximum modulation	44.1	80	0.683
				TSNIT average	61.0	95	0.897
				TSNIT standard deviation	59.3	95	0.830
				Superior RNFL average	66.1	95	0.877

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Inferior RNFL average	59.3	95	0.852
				NFI	79.7	95	0.938
				Normalized Inferior	61.0	95	0.850
				Normalized Superior	71.2	95	0.879
				Ellipse modulation	22.0	95	0.662
				Superior maximum	61.0	95	0.837
				Superior ratio	32.2	95	0.755
				Inferior maximum	47.5	95	0.811
				Inferior ratio	22.0	95	0.692
				Maximum modulation	25.2	95	0.683
[47] Leung, C. K 2005	Healthy Controls Glaucoma	46 (46) 39 (39)	Stratus OCT	Average RNFL thickness	NR	NR	0.90
				Superior quadrant RNFL thickness	NR	NR	0.87
				Inferior quadrant RNFL thickness	NR	NR	0.91
				Nasal quadrant RNFL thickness	NR	NR	0.69
				Temporal quadrant RNFL thickness	NR	NR	0.84
				Average macular thickness	NR	NR	0.72
				Superior macular thickness	NR	NR	0.80
				Inferior macular thickness	NR	NR	0.71
				Central macular thickness	NR	NR	0.72
				Macula 1-3mm Temporal	NR	NR	0.74
				Macula 1-3mm Superior	NR	NR	0.73
				Macula 1-3mm Nasal	NR	NR	0.66
				Macula 1-3mm Inferior	NR	NR	0.90
[86] Mansberger, S. L 2005	Healthy Controls Glaucoma	(220) (71)	FDT C20	Subjective/Quasi-objective assessment	7	87	NR
[48] Medeiros, F. A 2005	Healthy Controls Glaucoma	78(78) 88(88)	Stratus OCT	Average RNFL thickness	86	80	0.91
				Superior quadrant RNFL thickness	73	81	0.83
				Inferior quadrant RNFL thickness	89	80	0.91
				Nasal quadrant RNFL thickness	61	80	0.76
				Temporal quadrant RNFL thickness	38	81	0.65
				1 o' clock thickness	50	80	0.75
				2 o' clock thickness	52	80	0.74
				3 o' clock thickness	34	81	0.70

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				4 o' clock thickness	55	81	0.74
				5 o' clock thickness	63	80	0.80
				6 o' clock thickness	78	80	0.87
				7 o' clock thickness	81	80	0.87
				8 o' clock thickness	49	81	0.67
				9 o' clock thickness	22	82	0.51
				10 o' clock thickness	46	81	0.68
				11 o' clock thickness	68	80	0.78
				12 o' clock thickness	58	80	0.76
				Smax/Imax	16	80	0.35
				Imax/ Smax	44	81	0.65
				Imax/TAverage	50	81	0.76
				Smax/NAverage	17	80	0.48
				Smax/TAverage	43	80	0.64
				Smax	68	80	0.81
				Imax	85	80	0.90
				Max-Min	81	80	0.85
				Disc area	19	80	0.51
				Cup area	74	80	0.84
				Rim area	81	80	0.88
				Cup-disc area ratio	80	80	0.88
				Horizontal cup-disc ratio	74	80	0.86
				Vertical cup- disc ratio	81	80	0.88
				VIRA	82	80	0.87
				HIRW	77	80	0.88
				Macular volume	50	80	0.75
				Central macular thickness	18	80	0.47
				Macula 1-3mm Temporal	42	80	0.67
				Macula 1-3mm Superior	34	80	0.63
				Macula 1-3mm Nasal	31	80	0.55
				Macula 1-3mm Inferior	34	80	0.65
				Macula 3-5mm Temporal	51	80	0.75
				Macula 3-5mm Superior	48	80	0.73
				Macula 3-5mm Nasal	39	80	0.68
				Macula 3-5mm Inferior	73	82	0.81

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Average RNFL thickness	71	95	0.91
				Superior quadrant RNFL thickness	52	96	0.83
				Inferior quadrant RNFL thickness	65	96	0.91
				Nasal quadrant RNFL thickness	13	95	0.76
				Temporal quadrant RNFL thickness	22	95	0.65
				1 o' clock thickness	39	95	0.75
				2 o' clock thickness	21	95	0.74
				3 o' clock thickness	10	96	0.70
				4 o' clock thickness	22	95	0.74
				5 o' clock thickness	34	90	0.80
				6 o' clock thickness	56	95	0.87
				7 o' clock thickness	64	95	0.87
				8 o' clock thickness	24	95	0.67
				9 o' clock thickness	11	95	0.51
				10 o' clock thickness	26	96	0.68
				11 o' clock thickness	47	95	0.78
				12 o' clock thickness	31	95	0.76
				Smax/Imax	7	95	0.35
				Imax/ Smax	35	95	0.65
				Imax/TAverage	38	95	0.76
				Smax/NAverage	5	95	0.48
				Smax/TAverage	27	96	0.64
				Smax	50	95	0.81
				Imax	63	95	0.90
				Max-Min	55	95	0.85
				Disc area	6	95	0.51
				Cup area	50	95	0.84
				Rim area	51	95	0.88
				Cup-disc area ratio	69	95	0.88
				Horizontal cup-disc ratio	59	95	0.86
				Vertical cup- disc ratio	65	95	0.88
				VIRA	58	95	0.87
				HIRW	55	95	0.88
				Macular volume	35	95	0.75
				Central macular thickness	6	95	0.47

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Macula 1-3mm Temporal	22	95	0.67
				Macula 1-3mm Superior	18	95	0.63
				Macula 1-3mm Nasal	14	95	0.55
				Macula 1-3mm Inferior	26	95	0.65
				Macula 3-5mm Temporal	32	95	0.75
				Macula 3-5mm Superior	36	95	0.73
				Macula 3-5mm Nasal	21	95	0.68
				Macula 3-5mm Inferior	47	95	0.81
[49] Wollstein, G 2005	Healthy Controls Glaucoma	37 (37) 37 (26)	Stratus OCT	Average RNFL thickness	84.6	95	0.94
				Superior quadrant RNFL thickness	69.2	95	0.88
				Inferior quadrant RNFL thickness	80.8	95	0.94
				Nasal quadrant RNFL thickness	57.7	95	0.86
				Temporal quadrant RNFL thickness	46.2	95	0.83
				Disc area	15.4	95	0.55
				Cup area	69.2	95	0.91
				Rim area	88.5	95	0.97
				Cup-disc area ratio	80.8	95	0.94
				Horizontal cup-disc ratio	73.1	95	0.93
				Vertical cup- disc ratio	76.9	95	0.93
				VIRA	73.1	95	0.95
				HIRW	88.5	95	0.96
				Macular volume	46.2	95	0.8
				Average macular thickness	50	95	0.8
				Average RNFL thickness	92.3	80	0.94
				Superior quadrant RNFL thickness	76.9	80	0.88
				Inferior quadrant RNFL thickness	92.3	80	0.94
				Nasal quadrant RNFL thickness	84.6	80	0.86
				Temporal quadrant RNFL thickness	69.2	80	0.83
				Disc area	15.4	80	0.55
				Cup area	92.3	80	0.91
				Rim area	100	80	0.97
				Cup-disc area ratio	92.3	80	0.94
				Horizontal cup-disc ratio	92.3	80	0.93
				Vertical cup-disc ratio	96.2	80	0.93
				VIRA	96.2	80	0.95

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				HIRW	100	80	0.96
				Macular volume	73.1	80	0.8
				Average macular thickness	73.1	80	0.8
[50] Leung, C. K 2004	Healthy controls Suspects Glaucoma	107 83 124	Stratus OCT	Average RNFL thickness	NR	NR	0.897
				Superior quadrant RNFL thickness	NR	NR	0.855
				Inferior quadrant RNFL thickness	NR	NR	0.906
				Nasal quadrant RNFL thickness	NR	NR	0.742
				Temporal quadrant RNFL thickness	NR	NR	0.798
				Average RNFL thickness	NR	NR	0.912
				Superior quadrant RNFL thickness	NR	NR	0.876
				Inferior quadrant RNFL thickness	NR	NR	0.902
				Nasal quadrant RNFL thickness	NR	NR	0.766
				Temporal quadrant RNFL thickness	NR	NR	0.806
[51] Reus, N. J 2004	Healthy controls Glaucoma	73 146	GDX-VCC	NFI	89	95.9	0.98
[52] Medeiros, F. A 2004	Healthy controls Glaucoma	66 (66) 75 (75)	GDx VCC	TSNIT average	59	95	0.85
				Superior RNFL average	55	95	0.82
				Inferior RNFL average	49	95	0.84
				TSNIT standard deviation	48	95	0.82
				Inter-eye symmetry	9	95	0.5
				NFI	61	97	0.91
				Normalized Inferior	49	95	0.86
				Normalized Superior	53	95	0.82
				Ellipse modulation	25	95	0.75
				Superior maximum	48	95	0.8
				Superior ratio	27	95	0.8
				Inferior maximum	41	95	0.78
				Inferior ratio	36	95	0.79
				Maximum modulation	23	95	0.76
				TSNIT average	72	80	0.85
				Superior RNFL average	61	80	0.82
				Inferior RNFL average	68	80	0.84
				TSNIT standard deviation	72	80	0.82

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Inter-eye symmetry	25	80	NR
				NFI	87	80	0.91
				Normalized Inferior	72	80	0.86
				Normalized Superior	75	80	0.82
				Ellipse modulation	59	80	0.75
				Superior maximum	64	80	0.8
				Superior ratio	75	80	0.8
				Inferior maximum	64	80	0.78
				Inferior ratio	61	80	0.79
				Maximum modulation	60	80	0.76
			HRT-2	Disc area	11	95	0.59
				Rim area	32	95	0.73
				Rim volume	20	95	0.73
				Cup area	44	95	0.77
				Cup volume	41	95	0.75
				Cup shape measure	23	95	0.76
				Mean cup depth	33	95	0.72
				Maximum cup depth	25	95	0.68
				Height variation contour	11	95	0.54
				Mean RNFL thickness	37	95	0.73
				RFNL cross-sectional area	29	95	0.7
				Vertical cup-disc ratio	45	95	0.83
				Horizontal cup-disc ratio	29	95	0.74
				Cup-disc area ratio	55	95	0.81
				Rim-disc area ratio	55	95	0.81
				FSM discriminant	55	95	0.83
				Bathija discriminant	59	95	0.86
			Stratus OCT	Average RNFL thickness	71	95	0.91
				Superior quadrant RNFL thickness	49	95	0.81
				Inferior quadrant RNFL thickness	64	95	0.92
				Nasal quadrant RNFL thickness	19	95	0.78
				Temporal quadrant RNFL thickness	15	95	0.62
				1 o' clock thickness	37	95	0.74
				2 o' clock thickness	17	95	0.75

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				3 o' clock thickness	17	95	0.76
				4 o' clock thickness	23	95	0.75
				5 o' clock thickness	25	97	0.79
				6 o' clock thickness	56	95	0.89
				7 o' clock thickness	60	95	0.86
				8 o' clock thickness	23	95	0.63
				9 o' clock thickness	7	97	0.48
				10 o' clock thickness	21	97	0.66
				11 o' clock thickness	51	95	0.79
				12 o' clock thickness	33	95	0.74
				Smax/Imax	5	95	0.35
				Imax/ Smax	32	95	0.65
				Imax/TAverage	32	95	0.79
				Smax/NAverage	5	95	0.45
				Smax/TAverage	28	95	0.66
				Smax	60	95	0.79
				Imax	64	95	0.91
				Max-Min	63	95	0.84
				Average RNFL thickness	84	80	0.91
				Superior quadrant RNFL thickness	73	80	0.81
				Inferior quadrant RNFL thickness	89	80	0.92
				Nasal quadrant RNFL thickness	60	83	0.78
				Temporal quadrant RNFL thickness	37	80	0.62
				1 o' clock thickness	47	83	0.74
				2 o' clock thickness	57	80	0.75
				3 o' clock thickness	49	80	0.76
				4 o' clock thickness	56	81	0.75
				5 o' clock thickness	61	82	0.79
				6 o' clock thickness	84	80	0.89
				7 o' clock thickness	77	80	0.86
				8 o' clock thickness	45	80	0.63
				9 o' clock thickness	21	80	0.48
				10 o' clock thickness	41	82	0.66
				11 o' clock thickness	71	80	0.79
				12 o' clock thickness	59	80	0.74

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Smax/Imax	15	80	0.35
				Imax/ Smax	45	80	0.65
				Imax/TAverage	63	80	0.79
				Smax/NAverage	15	80	0.45
				Smax/TAverage	47	80	0.66
				Smax	65	80	0.79
				Imax	87	83	0.91
				Max-Min	75	80	0.84
[53] Medeiros, F. A 2004	Healthy controls Glaucoma	40 (40) 42 (42)	GDX-VCC	Superior RNFL average	52	95	0.81
				Inferior RNFL average	67	95	0.83
				NFI	71	95	0.91
				Normalized Inferior	67	95	0.87
				Normalized Superior	60	95	0.82
				Ellipse average	60	95	0.83
				Ellipse SD	43	95	0.82
				Ellipse modulation	26	95	0.65
				Superior maximum	57	95	0.81
				Superior ratio	33	95	0.79
				Inferior maximum	45	95	0.78
				Inferior ratio	36	95	0.79
				Maximum modulation	24	95	0.72
				Superior RNFL average	74	80	0.81
				Inferior RNFL average	74	80	0.83
				NFI	88	80	0.91
				Normalized Inferior	86	80	0.87
				Normalized Superior	67	80	0.82
				Ellipse average	71	80	0.83
				Ellipse SD	68	80	0.82
				Ellipse modulation	45	80	0.65
				Superior maximum	69	80	0.81
				Superior ratio	71	80	0.79
				Inferior maximum	67	80	0.78
				Inferior ratio	69	80	0.79
				Maximum modulation	55	80	0.72
			RNFL Photos	Nerve Fiber Layer (NFL/RNFL)	36	95	0.84

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Nerve Fiber Layer (NFL/RNFL)	81	80	0.84
[54] Mori, S 2010	Healthy controls Glaucoma	35 50	RTVue OCT	GCC Total Macula	NR	NR	0.922
				Macular volume	NR	NR	0.857
				Macula 1-3mm Temporal	NR	NR	0.807
				Macula 1-3mm Superior	NR	NR	0.698
				Macula 1-3mm Nasal	NR	NR	0.677
				Macula 1-3mm Inferior	NR	NR	0.86
				Macula 3-5mm Temporal	NR	NR	0.846
				Macula 3-5mm Superior	NR	NR	0.761
				Macula 3-5mm Nasal	NR	NR	0.762
				Macula 3-5mm Inferior	NR	NR	0.941
			Stratus OCT	Macular volume	NR	NR	0.841
[55] Salvetat, M. L 2010	Healthy controls Glaucoma	53 52	FDT N30	Mean deviation/defect (MD)	14	95	0.71
				Pattern standard deviation (PSD)	50	95	0.92
				Mean deviation/defect (MD)	37	90	0.71
				Pattern standard deviation (PSD)	60	90	0.92
				Mean deviation/defect (MD)	40	80	0.71
				Pattern standard deviation (PSD)	96	80	0.92
[56] Burgansky-Eliash, Z 2007	Healthy controls Glaucoma	15 (15) 61 (61)	FDT 24-2	Mean deviation/defect (MD)	NR	NR	0.69
				Pattern standard deviation (PSD)	NR	NR	0.733
			HFA SITA-Standard	Mean deviation/defect (MD)	NR	NR	0.746
				Pattern standard deviation (PSD)	NR	NR	0.767
[57] Ferreras, A 2007	Healthy controls Suspects Glaucoma	98 109 71	GDX-VCC	TSNIT average	70.2	85	0.838
				Superior RNFL average	68.4	85	0.828
				Inferior RNFL average	68.4	85	0.847
				TSNIT standard deviation	56.1	85	0.831
				NFI	80.7	85	0.894
				Normalized Inferior	64.9	85	0.855

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Normalized Superior	66.7	85	0.825
				Ellipse modulation	49.1	85	0.701
				Superior maximum	56.1	85	0.788
				Superior ratio	45.6	85	0.742
				Inferior maximum	52.6	85	0.799
				Inferior ratio	45.6	85	0.748
				Maximum modulation	54.4	85	0.758
				TSNIT average	56.1	95	0.838
				Superior RNFL average	63.2	95	0.828
				Inferior RNFL average	57.9	95	0.847
				TSNIT standard deviation	36.8	95	0.831
				NFI	63.2	95	0.894
				Normalized Inferior	57.9	95	0.855
				Normalized Superior	66.7	95	0.825
				Ellipse modulation	19.3	95	0.701
				Superior maximum	49.1	95	0.788
				Superior ratio	31.6	95	0.799
				Inferior maximum	40.4	95	0.799
				Inferior ratio	19.3	95	0.748
				Maximum modulation	19.3	95	0.758
			HRT-2	Disc area	38	85	0.609
				Rim area	81.7	85	0.886
				Rim volume	70.4	85	0.838
				Cup area	81.7	85	0.877
				Cup volume	71.8	85	0.844
				Cup- shape measure	69	85	0.844
				Mean cup depth	54.9	85	0.788
				Maximum cup depth	38	85	0.706
				Height variation contour	23.9	85	0.508
				Mean RNFL thickness	63.4	85	0.79
				RNFL cross sectional area	60.6	85	0.776
				Vertical cup-disc ratio	83.1	85	0.901
				Horizontal cup-disc ratio	71.8	85	0.855

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Cup-disc area ratio	83.1	85	0.906
				Rim-disc area ratio	83.1	85	0.906
				Mikelberg (FSM) Discriminant Function	83.1	85	0.914
				Contour Line Modulation (CLM) temp-Inferior	60.6	85	0.758
				Contour Line Modulation (CLM) temp-Superior	36.6	85	0.651
				Reference height	21.1	85	0.635
				Burk (RB) Discriminant Function	70.4	85	0.841
				Disc area	18.3	95	0.609
				Rim area	67.6	95	0.886
				Rim volume	53.5	95	0.838
				Cup area	56.3	95	0.877
				Cup volume	42.3	95	0.844
				Cup- shape measure	53.5	95	0.844
				Mean cup depth	32.4	95	0.788
				Maximum cup depth	14.1	95	0.706
				Height variation contour	18.3	95	0.508
				Mean RNFL thickness	40.8	95	0.79
				RNFL cross sectional area	38	95	0.776
				Vertical cup-disc ratio	70.4	95	0.901
				Horizontal cup-disc ratio	43.7	95	0.855
				Cup-disc area ratio	69	95	0.906
				Rim-disc area ratio	69	95	0.906
				Mikelberg (FSM) Discriminant Function	77.5	95	0.914
				Contour Line Modulation (CLM) temp-Inferior	47.9	95	0.758
				Contour Line Modulation (CLM) temp-Superior	22.5	95	0.651
				Reference height	5.6	95	0.635
				Burk (RB) Discriminant Function	59.2	95	0.841
			Stratus OCT	Average RNFL thickness	77.1	85	0.886
				Superior quadrant RNFL thickness	68.6	85	0.82
				Inferior quadrant RNFL thickness	65.7	85	0.884
				Nasal quadrant RNFL thickness	60	85	0.83
				Temporal quadrant RNFL thickness	61.4	85	0.772
				Superior hemisphere RNFL thickness	68.6	85	0.82
				Inferior hemisphere RNFL thickness	65.7	85	0.884

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				1 o' clock thickness	52.9	85	0.755
				2 o' clock thickness	65.7	85	0.785
				3 o' clock thickness	65.7	85	0.802
				4 o' clock thickness	51.4	85	0.799
				5 o' clock thickness	54.3	85	0.814
				6 o' clock thickness	57.1	85	0.849
				7 o' clock thickness	65.7	85	0.816
				8 o' clock thickness	48.6	85	0.721
				9 o' clock thickness	44.3	85	0.699
				10 o' clock thickness	57.1	85	0.803
				11 o' clock thickness	70	85	0.819
				12 o' clock thickness	61.4	85	0.775
				Smax/Imax	28.6	85	0.471
				Imax/ Smax	35.7	85	0.529
				Imax/TAverage	28.6	85	0.613
				Smax/NAverage	22.9	85	0.498
				Smax/TAverage	20	85	0.575
				Smax	67.1	85	0.871
				Imax	71.4	85	0.871
				Max-Min	58.6	85	0.781
				Average RNFL thickness	67.1	95	0.886
				Superior quadrant RNFL thickness	60	95	0.82
				Inferior quadrant RNFL thickness	55.7	95	0.884
				Nasal quadrant RNFL thickness	37.1	95	0.83
				Temporal quadrant RNFL thickness	31.4	95	0.772
				Superior hemisphere RNFL thickness	60	95	0.82
				Inferior hemisphere RNFL thickness	55.7	95	0.884
				1 o' clock thickness	47.1	95	0.755
				2 o' clock thickness	32.9	95	0.785
				3 o' clock thickness	32.9	95	0.802
				4 o' clock thickness	20	95	0.799
				5 o' clock thickness	44.3	95	0.824
				6 o' clock thickness	51.4	95	0.849
				7 o' clock thickness	60	95	0.816
				8 o' clock thickness	42.9	95	0.721

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				9 o' clock thickness	27.1	95	0.699
				10 o' clock thickness	38.6	95	0.803
				11 o' clock thickness	51.4	95	0.819
				12 o' clock thickness	50	95	0.775
				Smax/Imax	18.6	95	0.471
				Imax/ Smax	32.9	95	0.529
				Imax/TAverage	18.6	95	0.613
				Smax/NAverage	7.1	95	0.498
				Smax/TAverage	14.3	95	0.575
				Smax	51.4	95	0.871
				Imax	51.4	95	0.871
				Max-Min	32.9	95	0.781
[58] Danesh-Meyer, H. V 2006	Healthy controls Suspects Glaucoma	45 23 42	HFA SITA-Standard	Mean deviation/defect (MD)	NR	NR	0.78
				Pattern standard deviation (PSD)	NR	NR	0.80
			HRT-2	Rim area	NR	NR	0.62
				Rim volume	NR	NR	0.58
				Cup-shape measure	NR	NR	0.58
				MRA overall	NR	NR	0.54
			RNFL Photos	Unspecified cup disc ratio	NR	NR	0.81
				Disc Damage Likelihood Scale (DDLS)	NR	NR	0.91
[75] Kim, 2011	Healthy Controls Normal tension glaucoma POAG	58 51 52	RTVue-100	Average RNFL thickness (NTG) (BL)	64.71	89.66	0.822
				Average RNFL thickness (NTG) (ONL)	39.22	100	
				Average RNFL thickness (POAG) (BL)	78.85	89.66	0.913
				Average RNFL thickness (POAG) (ONL)	65.38	100	

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Superior quadrant RNFL thickness (NTG) (BL)	41.18	96.55	0.732
				Superior quadrant RNFL thickness (NTG) (ONL)	23.53	100	
				Superior quadrant RNFL thickness (POAG) (BL)	59.62	96.55	0.896
				Superior quadrant RNFL thickness (POAG) (ONL)	40.38	100	
				Inferior quadrant RNFL thickness (NTG) (BL)	74.51	77.59	0.846
				Inferior quadrant RNFL thickness (NTG) (ONL)	56.86	89.66	
				Inferior quadrant RNFL thickness (POAG) (BL)	78.85	77.59	0.884
				Inferior quadrant RNFL thickness (POAG) (ONL)	69.23	89.66	
				ROC disc area (NTG) (BL)			0.529
				ROC disc area (POAG) (BL)			0.504
				ROC cup area (NTG) (BL)			0.725
				ROC cup area (POAG) (BL)			0.766
				ROC rim area (NTG) (BL)			0.782
				ROC rim area (POAG) (BL)			0.819
				ROC CUP-Disc area ratio (NTG) (BL)			0.811
				ROC CUP-Disc area ratio (POAG) (BL)			0.838
				ROC CUP-Disc horizontal ratio (NTG) (BL)			0.761
				ROC CUP-Disc horizontal ratio (POAG) (BL)			0.749
				ROC CUP-Disc vertical ratio (NTG) (BL)			0.838
				ROC CUP-Disc vertical ratio (POAG) (BL)			0.891
				GCC Superior	47.06	86.21	0.684
				GCC Superior	29.41	94.83	

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				GCC Superior	80.77	86.21	0.899
				GCC Superior	51.92	94.83	
				GCC Inferior	72.55	86.21	0.875
				GCC Inferior	50.98	94.83	
				GCC Inferior	90.38	86.21	0.925
				GCC Inferior	75	94.83	
				GCC total macula	60.78	82.76	0.832
				GCC total macula	37.25	94.83	
				GCC total macula	92.31	82.76	0.947
				GCC total macula	75	94.83	
				GCC percent FLV	80.39	81.03	0.899
				GCC percent FLV	78.43	87.93	
				GCC percent FLV	86.54	82.76	0.947
				GCC percent FLV	84.62	87.93	
				GCC percent GLV	86.27	77.59	0.881
				GCC percent GLV	66.67	84.48	
				GCC percent GLV	98.08	77.59	0.961
				GCC percent GLV	94.23	84.48	
[76] Oddone, 2011	Healthy Controls POAG	50 70	Cirrus OCT	Average RNFL thickness	86	90	0.94
				Superior quadrant RNFL thickness	79	90	0.86
				Inferior quadrant RNFL thickness	82	90	0.91
				nasal quadrant RNFL thickness	38	90	0.77
				temp quadrant RNFL thickness	59	90	0.77
			GDx-VCC	TSNIT Average	84	90	0.94
				Superior RNFL Average	83	90	0.94

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Inferior RNFL Average	83	90	0.93
				TSNIT standard deviation	79	90	0.91
				NFI	90	90	0.97
			HRT 3	rim area	52	90	0.76
				rim volume	47	90	0.81
				Cup volume	58	90	0.81
				cup shape measure	86	90	0.94
				Linear CUP-DISC ratio	79	90	0.91
				Mean cup depth	48	90	0.76
				Maximum cup depth	12	90	0.62
				Height variation contour	21	90	0.62
				mean RNFL thickness	45	90	0.78
				RNFL cross sectional area	42	90	0.72
				Vertical CUP-DISC ratio	76	90	0.89
				Horizontal CUP-DISC ratio	50	90	0.8
				CUP-Disc area ratio	82	90	0.91
				MRA overall	89.4	73.7	
				MRA global	71.2	100	
				MRA temporal Inferior	72.7	97.4	
				MRA temporal Superior	66.7	92.1	
				MRA nasal Inferior	72.7	94.7	
				MRA nasal Superior	65.1	94.7	
				MRA nasal	63.6	89.5	

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				MRA temporal	37.9	100	
				GPS global	82	90	0.93
				GPS temporal Inferior	84	90	0.92
				GPS temporal Superior	80	90	0.93
				GPS nasal Inferior	84	90	0.93
				GPS nasal Superior	84	90	0.93
				GPS temporal	80	90	0.93
				GPS nasal	80	90	0.93
				FSM discriminant	82	90	0.92
				RB discriminant	70	90	0.88
[77] Girkin, 2011	Healthy Controls European descent POAG European descent Healthy Controls African descent POAG African descent	105 101 62 58	Cirrus OCT	ROC Average RNFL thickness ED	NR	NR	0.88
				ROC Average RNFL thickness AD	NR	NR	0.92
				rim area ED	NR	NR	0.81
				rim area AD	NR	NR	0.84
				Average macular thickness ED	NR	NR	0.86
				Average macular thickness AD	NR	NR	0.9
[78] Leite, 2011	Healthy Controls POAG	107 (58) 126 (91)	Cirrus OCT	Average RNFL thickness	80.3	80	0.88
					65.6	95	0.88
				Superior quadrant RNFL thickness	79.3	80	0.88
					63.9	95	0.88
				Inferior quadrant RNFL thickness	79.6	80	0.87
					65.9	95	0.87
				nasal quadrant RNFL thickness	34.4	80	0.6

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
					14.1	95	0.6
				temp quadrant RNFL thickness	41.7	80	0.69
					13.6	95	0.69
			RTVue OCT	Average RNFL thickness	77.9	80	0.87
					62.1	95	0.87
				Superior quadrant RNFL thickness	77.8	80	0.87
					63.8	95	0.86
				Inferior quadrant RNFL thickness	77.9	80	0.86
					61.7	95	0.86
				nasal quadrant RNFL thickness	55.1	80	0.71
					34.9	95	0.71
				temp quadrant RNFL thickness	48.9	80	0.72
					20.8	95	0.72
			Spectralis OCT	Average RNFL thickness	81.1	80	0.88
					68	95	0.88
				Superior quadrant RNFL thickness	81.9	80	0.88
					70	95	0.88
				Inferior quadrant RNFL thickness	76.7	80	0.85
					61.8	95	0.85
				nasal quadrant RNFL thickness	54.8	80	0.73
					31.6	95	0.73
				temp quadrant RNFL thickness	47.6	80	0.7

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
					21.1	95	0.7
[79] Mansoori, 2010	Healthy Controls OHT POAG	66 55 51	SD-OCT (Normal vs OHT)	ROC Average RNFL thickness	NR	NR	0.616
				ROC Superior quadrant RNFL thickness	NR	NR	0.515
				ROC Inferior quadrant RNFL thickness	NR	NR	0.554
				ROC nasal quadrant RNFL thickness	NR	NR	0.53
				ROC temp quadrant RNFL thickness	NR	NR	0.651
			SD-OCT (Normal vs. glaucoma)	ROC Average RNFL thickness	NR	NR	0.778
				ROC Superior quadrant RNFL thickness	NR	NR	0.819
				ROC Inferior quadrant RNFL thickness	NR	NR	0.953
				ROC nasal quadrant RNFL thickness	NR	NR	0.611
				ROC temp quadrant RNFL thickness	NR	NR	0.601
			SD-OCT (glaucoma vs. OHT)	ROC Average RNFL thickness	NR	NR	0.763
				ROC Superior quadrant RNFL thickness	NR	NR	0.816
				ROC Inferior quadrant RNFL thickness	NR	NR	0.932
				ROC nasal quadrant RNFL thickness	NR	NR	0.593
				ROC temp quadrant RNFL thickness	NR	NR	0.47
[80] Horn, 2011	Healthy Controls OHT Preperimetric OAG	97 54 77	Spectralis OCT (Preperimetric OAG vs. healthy control)	ROC Average RNFL thickness	NR	NR	0.837
			Spectralis OCT (OAG vs. healthy control)	ROC Average RNFL thickness	NR	NR	0.945
			Spectralis OCT (Moderate OAG vs. healthy control)	ROC Average RNFL thickness	NR	NR	0.951
[81] Shoji,	Healthy Controls	31	SD-OCT RTVue	Average RNFL thickness	87.1	80	0.826

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
2011	high myopia with glaucoma	51			22.6	95	0.826
				Superior quadrant RNFL thickness	71	80	0.791
					32.3	95	0.791
				Inferior quadrant RNFL thickness	80.6	80	0.811
					32.3	95	0.811
				disc area	27.5	80	0.526
					11.8	95	0.526
				cup area	49	80	0.705
					9.8	95	0.705
				rim area	71	80	0.805
					6.5	95	0.805
				CUP-Disc area ratio	62.7	80	0.8
					29.4	95	0.8
				CUP-Disc horizontal ratio	51	80	0.767
					41.2	95	0.767
				CUP-Disc vertical ratio	70.6	80	0.844
					35.3	95	0.844
				GCC Superior	93.5	80	0.939
					58.1	95	0.939
				GCC Inferior	90.3	80	0.935
					83.9	95	0.935
[82] Benitez-del-Castillo, 2011	Healthy Controls Glaucoma	55 33	Cirrus OCT	Average RNFL thickness	72.7	94.3	0.897
				Superior quadrant RNFL thickness	72.7	98.1	0.889

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				Inferior quadrant RNFL thickness	81.8	88.7	0.882
				nasal quadrant RNFL thickness	66.7	86.8	0.784
				temp quadrant RNFL thickness	75.8	67.9	0.754
			GDX-ECC	TSNIT Average	75.9	92.11	0.886
				NFI	72.4	93.9	0.888
			GDX-VCC	TSNIT Average	63.6	94.3	0.804
				NFI	84.9	86.8	0.88
[83] Aptel, 2010	Healthy Controls Suspects Glaucoma	40 40 40	Cirrus OCT	Average RNFL thickness	98	70	0.948
					96	90	0.948
				Superior quadrant RNFL thickness	96	70	0.963
					94	90	0.963
				Inferior quadrant RNFL thickness	96	70	0.943
					96	90	0.943
				nasal quadrant RNFL thickness	85	70	0.744
					55	90	0.744
				temp quadrant RNFL thickness	88	70	0.872
					72	90	0.872
			GDX-VCC	TSNIT Average	78	70	0.789
					54	90	0.789
				Superior RNFL Average	86	70	0.894
					71	90	0.894
				Inferior RNFL Average	86	70	0.832
					71	90	0.832

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				NFI	92	70	0.884
					71	90	0.884
					42.86	85	
					22.45	95	
				Superior RNFL Average	91.84	39.25	0.726
					38.78	85	
					8.16	95	
				Inferior RNFL Average	71.43	54.21	0.636
					36.73	85	
					24.49	95	
				NFI	81.63	53.27	0.739
					46.94	85	
					16.33	95	
			Stratus OCT	Average RNFL thickness	54.72	91.41	0.785
					56.25	85	0.785
					11.32	95	0.785
				Superior quadrant RNFL thickness	71.43	68.22	0.719
					38.78	85	0.719
					8.16	95	0.719
				Inferior quadrant RNFL thickness	79.25	68.84	0.712
					35.85	85	0.712
					11.32	95	0.712
				nasal quadrant RNFL thickness	54.72	87.5	0.733

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
					54.72	85	0.733
					15.09	95	0.733
				temp quadrant RNFL thickness	73.58	60.94	0.684
					35.85	85	0.684
					18.87	95	0.684
[84] Cho, 2011	Healthy Controls Glaucoma patients	43 49	OTI OCT	Average RNFL thickness	57.1	100	0.969
				Superior quadrant RNFL thickness	55.1	100	0.969
				Inferior quadrant RNFL thickness	55.1	100	0.936
				nasal quadrant RNFL thickness	63.3	100	0.893
				temp quadrant RNFL thickness	40.8	88.4	0.797
				one o'clock thickness	46.9	100	0.894
				two o'clock thickness	51	88.4	0.841
				three o'clock thickness	28.6	93	0.74
				four o'clock thickness	28.6	95.3	0.742
				five o'clock thickness	36.7	100	0.666
				six o'clock thickness	53.1	100	0.798
				seven o'clock thickness	55.1	97.7	0.869
				eight o'clock thickness	26.5	100	0.8
				nine o'clock thickness	18.4	100	0.783
				ten o'clock thickness	16.3	100	0.699
				eleven o'clock thickness	28.6	100	0.711
				twelve o'clock thickness	40.8	100	0.928
			Stratus OCT	Average RNFL thickness	53.4	100	0.959
				Superior quadrant RNFL thickness	49	100	0.959
				Inferior quadrant RNFL thickness	51	100	0.51

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				nasal quadrant RNFL thickness	51	100	0.944
				temp quadrant RNFL thickness	28.6	95.3	0.824
				one o'clock thickness	30.7	100	0.897
				two o'clock thickness	38.8	95.3	0.801
				three o'clock thickness	20.4	95.3	0.766
				four o'clock thickness	26.5	97.7	0.762
				five o'clock thickness	34.7	97.7	0.849
				six o'clock thickness	46.9	100	0.909
				seven o'clock thickness	51	100	0.908
				eight o'clock thickness	22.4	100	0.769
				nine o'clock thickness	18.4	97.7	0.76
				ten o'clock thickness	24.5	100	0.829
				eleven o'clock thickness	36.7	100	0.892
				twelve o'clock thickness	26.5	100	0.857
[85] Francis, 2011	Healthy Controls	6082	FDT C20-1	subjective assessment (total population)	67	79	
				subjective assessment (family history of glaucoma)	52	82	
				subjective assessment (age over 65)	70	61	
			SITA-Standard 24-2	Mean deviation (total population)	88	64	0.861
				Mean deviation (family history of glaucoma)	81	69	0.833
				Mean deviation (age over 65)	90	45	0.835
				PSD (total population)	76	78	0.868
				PSD (family history of glaucoma)	73	81	0.86
				PSD (age over 65)	81	64	0.835

Study	Population	Number of eyes (patients)	Device	Parameters	Sensitivity	Specificity	AU ROC
				GHT outside norm (total population)	90	71	
				GHT outside norm (family history of glaucoma)	81	72	
				GHT outside norm (age over 65)	96	56	
				subjective assessment (total population)	80	89	
			Goldmann applanation tonometer	IOP (total population)	24	97	0.705
				IOP (family history of glaucoma)	23	95	0.624
				IOP (age over 65)	26	95	0.668
			Disc Photo	Vertical CUP-DISC ratio (total population)	60	98	0.9
				Vertical CUP-DISC ratio (family history of glaucoma)	58	97	0.9
				Vertical CUP-DISC ratio (age over 65)	58	96	0.885

Evidence Table 5. Risk of bias

Study	Patients representative	Clear selection criteria	Appropriate reference standard	Short time period between index and reference test	Same reference test for all patients	Reference standard independent of index test	Detailed description of index test	Detailed description of reference standard	Index test interpreted without reference standard results	Reference standard interpreted without index test results	Adequate clinical data available	Uninterpretable/ intermediate results reported	Withdrawals from test explained
[83]Aptel, 2010	No	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Yes
[67]Badala, 2007	No	Yes	Yes	Unclear	Unclear	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	No
[44]Bagga, 2006	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	Yes	Unclear
[82]Benitez-del-Castillo, 2011	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Yes
[16]Bozkurt, 2010	No	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	No	No	Yes	Yes	No
[38]Brusini, 2006	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Unclear	Unclear	Yes	No
[37]Burgansky-Eliash, 2007	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Unclear	No	No
[56]Burgansky-Eliash, 2007	No	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	No	Yes	Unclear	No	No
[14]Chang, R. T 2009	Yes	Yes	Yes	Unclear	No	Yes	Yes	Yes	Unclear	Unclear	Yes	No	Yes
[24]Chen, 2005	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	No	No
[43]Chen, 2008	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	No	Yes
[84]Cho, 2011	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Yes
[46]Da Pozzo, 2005	No	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	No	Yes	Unclear	Yes	No
[58]Danesh-Meyer, 2006	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Unclear	Unclear
[68]De Leon-Ortega, 2007	No	Yes	No	Unclear	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes
[4]Fang, 2010	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
[27]Ferreras, 2007	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
[33]Ferreras, 2007	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Unclear	Yes	Yes
[57]Ferreras, 2008	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	No	Unclear
[85]Francis, 2011	Yes	No	Yes	Yes	Yes	Unclear	Yes	Unclear	Unclear	Unclear	Yes	Unclear	Yes

Study	Patients representative	Clear selection criteria	Appropriate reference standard	Short time period between index and reference test	Same reference test for all patients	Reference standard independent of index test	Detailed description of index test	Detailed description of reference standard	Index test interpreted without reference standard results	Reference standard interpreted without index test results	Adequate clinical data available	Uninterpretable/ intermediate results reported	Withdrawals from test explained
[77]Girkin, 2011	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Unclear
[5]Healey, 2010	Yes	No	Unclear	Unclear	No	Unclear	Unclear	Yes	Unclear	Unclear	Unclear	Yes	Yes
[74]Hong, 2007	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	Yes	No	No
[34]Hong, 2007	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Unclear	Unclear	Yes	No
[80]Horn, 2011	No	Yes	Unclear	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	No	No
[45]Kanamori, 2006	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Unclear	Yes	Yes
[75]Kim, 2011	No	Yes	Unclear	Yes	Yes	Unclear	Unclear	Unclear	Unclear	Unclear	Yes	No	No
[36]Leeprechanon, 2007	No	Yes	Yes	Yes	Unclear	Yes	Yes	No	Yes	Yes	Unclear	No	No
[78]Leite, 2010	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	No	No
[60]Leite, 2011	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear
[47]Leung, 2005	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Yes
[50]Leung, 2004	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	No	No
[10]Li, 2010	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
[71]Lu, 2008	No	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Unclear	Unclear	Yes	No	No
[73]Mai, 2007	No	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	No	No	Unclear	Unclear	No
[3]Mansoori, 2010	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Unclear	Yes
[79]Mansoori, 2010	No	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	No	No
[69]Medeiros, 2004	No	Unclear	No	No	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes
[72]Medeiros, 2004	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes
[52]Medeiros, 2005	No	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes
[53]Medeiros, 2006	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	No	No
[70]Medeiros, 2007	No	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Study	Patients representative	Clear selection criteria	Appropriate reference standard	Short time period between index and reference test	Same reference test for all patients	Reference standard independent of index test	Detailed description of index test	Detailed description of reference standard	Index test interpreted without reference standard results	Reference standard interpreted without index test results	Adequate clinical data available	Uninterpretable/ intermediate results reported	Withdrawals from test explained
[48]Medeiros, 2008	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	No	No
[29]Moreno-Montanes, 2008	Yes	No	No	Unclear	Yes	Yes	Yes	Yes	No	Unclear	Yes	Yes	Yes
[61]Moreno-Montanes, 2009	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	No	No
[62]Moreno-Montanes, 2010	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Unclear	Yes	Yes	Unclear
[54]Mori, 2010	No	Unclear	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	No	No
[30]Naithani, 2007	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Unclear	No	No
[64]Ng, 2009	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	No	No
[66]Nouri-Mahdavi, 2008	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes	Unclear	Unclear	Yes	No	No
[21]Oddone, 2009	No	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
[76]Oddone, 2011	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	No	Yes
[6]Pablo, 2010	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
[28]Parikh, 2008	No	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes	Yes
[11]Park, 2009	No	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Yes	Unclear	Yes	No
[41]Pierre-Filho Pde, 2006	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
[65]Polo, 2009	No	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	No	Unclear	Yes	No	No
[31]Pueyo, 2007	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Unclear	No	No
[8]Pueyo, 2009	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No
[25]Racette, 2008	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Unclear	No	No
[7]Rao, 2010	No	Yes	No	Unclear	Yes	Yes	Yes	No	Unclear	Unclear	Unclear	Unclear	Yes
[63]Reddy, 2009	No	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	Yes	No
[51]Reus, 2004	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Yes

Study	Patients representative	Clear selection criteria	Appropriate reference standard	Short time period between index and reference test	Same reference test for all patients	Reference standard independent of index test	Detailed description of index test	Detailed description of reference standard	Index test interpreted without reference standard results	Reference standard interpreted without index test results	Adequate clinical data available	Uninterpretable/ intermediate results reported	Withdrawals from test explained
[9]Reus, 2010	No	Yes	Yes	Unclear	Yes	Yes	Yes	Unclear	Yes	Unclear	No	No	No
[17]Saito, 2009	Yes	Yes	Yes	Unclear	No	Yes	Yes	Yes	Yes	Unclear	Yes	No	No
[13]Salim, 2009	Yes	Yes	Yes	Unclear	Yes	No	Yes	Yes	No	No	Yes	No	Unclear
[55]Salvetat, 2010	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Unclear	Yes	Yes
[40]Sample, 2006	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Yes	No	No
[18]Sehi, 2007	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	No
[32]Sehi, 2009	No	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Yes
[39]Shah, 2006	No	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	No	Yes	Unclear	Yes	Yes
[81]Shoji, 2011	No	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	No	No
[42]Sihota, 2006	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Yes	No	Unclear	Unclear	Yes	No
[20]Sung, 2009	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Yes
[23]Tafreshi, 2009	No	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Unclear
[26]Takahashi, 2008	No	No	Unclear	No	Yes	Yes	Yes	No	Yes	Unclear	Unclear	Yes	Unclear
[22]Takmaz, 2009	No	No	Yes	Unclear	Yes	Unclear	Yes	Yes	Unclear	Unclear	Yes	No	Unclear
[35]Uysal, 2007	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Unclear	Unclear	No	Unclear
[49]Wollstein, 2005	No	Yes	No	Yes	Yes	Unclear	Yes	No	Unclear	Unclear	Unclear	No	No
[19]Yuksel, 2009	Yes	No	Yes	Yes	Yes	Unclear	Yes	Yes	Unclear	Yes	Yes	No	No
[15]Zeppieri, 2010	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Yes
[12]Zheng, 2010	No	Yes	Yes	Unclear	Unclear	Yes	Yes	Yes	Unclear	Yes	Yes	Yes	Yes
[59]Zhong, 2010	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

References

1 Burr JM, Mowatt G, Hernįndez R *et al*. The clinical effectiveness and cost-effectiveness of screening for open angle glaucoma: a systematic review and economic evaluation. 11. 2007.

2 Hatt S, Wormald R, Burr J. Screening for prevention of optic nerve damage due to chronic open angle glaucoma. Cochrane Database Syst Rev 2006; (4):CD006129.

3 Mansoori T, Viswanath K, Balakrishna N. Quantification of Retinal Nerve Fiber Layer Thickness in Normal Eyes, Eyes with Ocular Hypertension, and Glaucomatous Eyes with SD-OCT. Ophthalmic Surg Lasers Imaging 2010; 41(6):S50-7.

4 Fang Y, Pan YZ, Li M, Qiao RH, Cai Y. Diagnostic capability of Fourier-Domain optical coherence tomography in early primary open angle glaucoma. Chin Med J (Engl) 2010; 123(15):2045-50.

5 Healey PR, Lee AJ, Aung T, Wong TY, Mitchell P. Diagnostic accuracy of the Heidelberg Retina Tomograph for glaucoma a population-based assessment. Ophthalmology 2010; 117(9):1667-73.

6 Pablo LE, Ferreras A, Schlottmann PG. Retinal nerve fibre layer evaluation in ocular hypertensive eyes using optical coherence tomography and scanning laser polarimetry in the diagnosis of early glaucomatous defects. Br J Ophthalmol 2010.

7 Rao HL, Zangwill LM, Weinreb RN, Sample PA, Alencar LM, Medeiros FA. Comparison of different spectral domain optical coherence tomography scanning areas for glaucoma diagnosis. Ophthalmology 2010; 117(9):1692-9, 1699.e1.

8 Pueyo V, Polo V, Larrosa JM, Pablo LE, Ferreras A, Honrubia FM. Ability of optical imaging devices to detect early structural damage in ocular hypertension. Ann Ophthalmol (Skokie) 2009; 41(3-4):150-6.

9 Reus NJ, Lemij HG, Garway-Heath DF *et al*. Clinical assessment of stereoscopic optic disc photographs for glaucoma: the European Optic Disc Assessment Trial. Ophthalmology 2010; 117(4):717-23.

10 Li G, Fansi AK, Boivin JF, Joseph L, Harasymowycz P. Screening for glaucoma in high-risk populations using optical coherence tomography. Ophthalmology 2010; 117(3):453-61.

11 Park SB, Sung KR, Kang SY, Kim KR, Kook MS. Comparison of glaucoma diagnostic Capabilities of Cirrus HD and Stratus optical coherence tomography. Arch Ophthalmol 2009; 127(12):1603-9.

12 Zheng Y, Wong TY, Lamoureux E *et al*. Diagnostic ability of Heidelberg Retina Tomography in detecting glaucoma in a population setting: the Singapore Malay Eye Study. Ophthalmology 2010; 117(2):290-7.

13 Salim S, Netland PA, Fung KH, Smith ME, Aldridge A. Assessment of the Student Sight Savers Program methods for glaucoma screening. Ophthalmic Epidemiol 2009; 16(4):238-42.

14 Chang RT, Knight OJ, Feuer WJ, Budenz DL. Sensitivity and specificity of time-domain versus spectral-domain optical coherence tomography in diagnosing early to moderate glaucoma. Ophthalmology 2009; 116(12):2294-9.

15 Zeppieri M, Brusini P, Parisi L, Johnson CA, Sampaolesi R, Salvetat ML. Pulsar perimetry in the diagnosis of early glaucoma. Am J Ophthalmol 2010; 149(1):102-12.

16 Bozkurt B, Irkec M, Arslan U. Diagnostic accuracy of Heidelberg Retina Tomograph III classifications in a Turkish primary open-angle glaucoma population. Acta Ophthalmol 2010; 88(1):125-30.

17 Saito H, Tsutsumi T, Araie M, Tomidokoro A, Iwase A. Sensitivity and specificity of the Heidelberg Retina Tomograph II Version 3.0 in a population-based study: the Tajimi Study. Ophthalmology 2009; 116(10):1854-61.

18 Sehi M, Grewal DS, Sheets CW, Greenfield DS. Diagnostic ability of Fourier-domain vs time-domain optical coherence tomography for glaucoma detection. Am J Ophthalmol 2009; 148(4):597-605.

19 Yuksel N, Altintas O, Ozkan B, Karadag S, Caglar Y. Discriminating ability of optical coherence tomography data in staging glaucomatous damage. Can J Ophthalmol 2009; 44(3):297-307.

20 Sung KR, Kim DY, Park SB, Kook MS. Comparison of retinal nerve fiber layer thickness measured by Cirrus HD and Stratus optical coherence tomography. Ophthalmology 2009; 116(7):1264-70, 1270.e1.

21 Oddone F, Centofanti M, Iester M *et al*. Sector-based analysis with the Heidelberg Retinal Tomograph 3 across disc sizes and glaucoma stages: a multicenter study. Ophthalmology 2009; 116(6):1106-11.e1-3.

22 Takmaz T, Can I. Comparison of glaucoma probability score and Moorfields regression analysis to discriminate glaucomatous and healthy eyes. Eur J Ophthalmol 2009; 19(2):207-13.

23 Tafreshi A, Sample PA, Liebmann JM *et al*. Visual function-specific perimetry to identify glaucomatous visual loss using three different definitions of visual field abnormality. Invest Ophthalmol Vis Sci 2009; 50(3):1234-40.

24 Chen HY, Huang ML, Tsai YY, Hung PT, Lin EJ. Comparing glaucomatous optic neuropathy in primary open angle and primary angle closure glaucoma eyes by scanning laser polarimetry-variable corneal compensation. J Glaucoma 2008; 17(2):105-10.

25 Racette L, Medeiros FA, Zangwill LM, Ng D, Weinreb RN, Sample PA. Diagnostic accuracy of the Matrix 24-2 and original N-30 frequency-doubling technology tests compared with standard automated perimetry. Invest Ophthalmol Vis Sci 2008; 49(3):954-60.

26 Takahashi H, Chihara E. Impact of diabetic retinopathy on quantitative retinal nerve fiber layer measurement and glaucoma screening. Invest Ophthalmol Vis Sci 2008; 49(2):687-92.

27 Ferreras A, Pablo LE, Pajarin AB, Larrosa JM, Polo V, Pueyo V. Diagnostic ability of the Heidelberg Retina Tomograph 3 for glaucoma. Am J Ophthalmol 2008; 145(2):354-9.

28 Parikh RS, Parikh SR, Kumar RS, Prabakaran S, Babu JG, Thomas R. Diagnostic capability of scanning laser polarimetry with variable cornea compensator in Indian patients with early primary open-angle glaucoma. Ophthalmology 2008; 115(7):1167-72.e1.

29 Moreno-Montanes J, Anton A, Garcia N, Mendiluce L, Ayala E, Sebastian A. Glaucoma probability score vs Moorfields classification in normal, ocular hypertensive, and glaucomatous eyes. Am J Ophthalmol 2008; 145(2):360-8.

30 Naithani P, Sihota R, Sony P *et al*. Evaluation of optical coherence tomography and heidelberg retinal tomography parameters in detecting early and moderate glaucoma. Invest Ophthalmol Vis Sci 2007; 48(7):3138-45.

31 Pueyo V, Polo V, Larrosa JM, Ferreras A, Pablo LE, Honrubia FM. Diagnostic ability of the Heidelberg retina tomograph, optical coherence tomograph, and scanning laser polarimeter in open-angle glaucoma. J Glaucoma 2007; 16(2):173-7.

32 Sehi M, Ume S, Greenfield DS. Scanning laser polarimetry with enhanced corneal compensation and optical coherence tomography in normal and glaucomatous eyes. Invest Ophthalmol Vis Sci 2007; 48(5):2099-104.

33 Ferreras A, Pajarin AB, Polo V, Larrosa JM, Pablo LE, Honrubia FM. Diagnostic ability of Heidelberg Retina Tomograph 3 classifications: glaucoma probability score versus Moorfields regression analysis. Ophthalmology 2007; 114(11):1981-7.

34 Hong S, Chung W, Hong YJ, Seong GJ. Discriminating ability of Humphrey matrix perimetry in early glaucoma patients. Ophthalmologica 2007; 221(3):195-9.

35 Uysal Y, Bayer A, Erdurman C, Kilic S. Sensitivity and specificity of Heidelberg Retinal Tomography II parameters in detecting early and moderate glaucomatous damage: effect of disc size. Clin Experiment Ophthalmol 2007; 35(2):113-8.

36 Leeprechanon N, Giangiacomo A, Fontana H, Hoffman D, Caprioli J. Frequency-doubling perimetry: comparison with standard automated perimetry to detect glaucoma. Am J Ophthalmol 2007; 143(2):263-71.

37 Burgansky-Eliash Z, Wollstein G, Bilonick RA, Ishikawa H, Kagemann L, Schuman JS. Glaucoma detection with the Heidelberg retina tomograph 3. Ophthalmology 2007; 114(3):466-71.

38 Brusini P, Salvetat ML, Zeppieri M, Tosoni C, Parisi L, Felletti M. Comparison between GDx VCC scanning laser polarimetry and Stratus OCT optical coherence tomography in the diagnosis of chronic glaucoma. Acta Ophthalmol Scand 2006; 84(5):650-5.

39 Shah NN, Bowd C, Medeiros FA *et al*. Combining structural and functional testing for detection of glaucoma. Ophthalmology 2006; 113(9):1593-602.

40 Sample PA, Medeiros FA, Racette L *et al*. Identifying glaucomatous vision loss with visual-function-specific perimetry in the diagnostic innovations in glaucoma study. Invest Ophthalmol Vis Sci 2006; 47(8):3381-9.

41 Pierre-Filho Pde T, Schimiti RB, de Vasconcellos JP, Costa VP. Sensitivity and specificity of frequency-doubling technology, tendency-oriented perimetry, SITA Standard and SITA Fast perimetry in perimetrically inexperienced individuals. Acta Ophthalmol Scand 2006; 84(3):345-50.

42 Sihota R, Sony P, Gupta V, Dada T, Singh R. Diagnostic capability of optical coherence tomography in evaluating the degree of glaucomatous retinal nerve fiber damage. Invest Ophthalmol Vis Sci 2006; 47(5):2006-10.

43 Chen HY, Wang TH, Lee YM, Hung TJ. Retinal nerve fiber layer thickness measured by optical coherence tomography and its correlation with visual field defects in early glaucoma. J Formos Med Assoc 2005; 104(12):927-34.

44 Bagga H, Feuer WJ, Greenfield DS. Detection of psychophysical and structural injury in eyes with glaucomatous optic neuropathy and normal standard automated perimetry. Arch Ophthalmol 2006; 124(2):169-76.

45 Kanamori A, Nagai-Kusuhara A, Escano MF, Maeda H, Nakamura M, Negi A. Comparison of confocal scanning laser ophthalmoscopy, scanning laser polarimetry and optical coherence tomography to discriminate ocular hypertension and glaucoma at an early stage. Graefes Arch Clin Exp Ophthalmol 2006; 244(1):58-68.

46 Da Pozzo S, Iacono P, Marchesan R, Fantin A, Ravalico G. Scanning laser polarimetry with variable corneal compensation and detection of glaucomatous optic neuropathy. Graefes Arch Clin Exp Ophthalmol 2005; 243(8):774-9.

47 Leung CK, Chan WM, Yung WH *et al*. Comparison of macular and peripapillary measurements for the detection of glaucoma: an optical coherence tomography study. Ophthalmology 2005; 112(3):391-400.

48 Medeiros FA, Zangwill LM, Bowd C, Vessani RM, Susanna R Jr, Weinreb RN. Evaluation of retinal nerve fiber layer, optic nerve head, and macular thickness measurements for glaucoma detection using optical coherence tomography. Am J Ophthalmol 2005; 139(1):44-55.

49 Wollstein G, Ishikawa H, Wang J, Beaton SA, Schuman JS. Comparison of three optical coherence tomography scanning areas for detection of glaucomatous damage. Am J Ophthalmol 2005; 139(1):39-43.

50 Leung CK, Yung WH, Ng AC, Woo J, Tsang MK, Tse KK. Evaluation of scanning resolution on retinal nerve fiber layer measurement using optical coherence tomography in normal and glaucomatous eyes. J Glaucoma 2004; 13(6):479-85.

51 Reus NJ, Lemij HG. Diagnostic accuracy of the GDx VCC for glaucoma. Ophthalmology 2004; 111(10):1860-5.

52 Medeiros FA, Zangwill LM, Bowd C, Weinreb RN. Comparison of the GDx VCC scanning laser polarimeter, HRT II confocal scanning laser ophthalmoscope, and stratus OCT optical coherence tomograph for the detection of glaucoma. Arch Ophthalmol 2004; 122(6):827-37.

53 Medeiros FA, Zangwill LM, Bowd C, Mohammadi K, Weinreb RN. Comparison of scanning laser polarimetry using variable corneal compensation and retinal nerve fiber layer photography for detection of glaucoma. Arch Ophthalmol 2004; 122(5):698-704.

54 Mori S, Hangai M, Sakamoto A, Yoshimura N. Spectral-domain optical coherence tomography measurement of macular volume for diagnosing glaucoma. J. Glaucoma 2010; 19(8):528-34.

55 Salvetat ML, Zeppieri M, Tosoni C, Parisi L, Brusini P. Non-conventional perimetric methods in the detection of early glaucomatous functional damage. Eye 2010; 24(5):835-42.

56 Burgansky-Eliash Z, Wollstein G, Patel A *et al*. Glaucoma detection with matrix and standard achromatic perimetry. Br. J. Ophthalmol. 2007; 91(7):933-8.

57 Ferreras A, Polo V, Larrosa JM *et al*. Can frequency-doubling technology and short-wavelength automated perimetries detect visual field defects before standard automated perimetry in patients with preperimetric glaucoma? J. Glaucoma 2007; 16(4):372-83.

58 Danesh-Meyer HV, Gaskin BJ, Jayusundera T, Donaldson M, Gamble GD. Comparison of disc damage likelihood scale, cup to disc ratio, and Heidelberg retina tomograph in the diagnosis of glaucoma. Br. J. Ophthalmol. 2006; 90(4):437-41.

59 Zhong Y, Zhou X, Cheng Y, Xie L. Relation between blue-on-yellow perimetry and optical coherence tomography in normal tension glaucoma. Can J Ophthalmol 2010; 45(5):494-500.

60 Leite MT, Zangwill LM, Weinreb RN *et al*. Effect of disease severity on the performance of Cirrus spectral-domain OCT for glaucoma diagnosis. Invest Ophthalmol Vis Sci 2010; 51(8):4104-9.

61 Moreno-Montanes J, Anton A, Garcia N, Olmo N, Morilla A, Fallon M. Comparison of retinal nerve fiber layer thickness values using Stratus Optical Coherence Tomography and Heidelberg Retina Tomograph-III. J Glaucoma 2009; 18(7):528-34.

62 Moreno-Montanes J, Olmo N, Alvarez A, Garcia N, Zarranz-Ventura J. Cirrus high-definition optical coherence tomography compared with Stratus optical coherence tomography in glaucoma diagnosis. Invest Ophthalmol Vis Sci 2010; 51(1):335-43.

63 Reddy S, Xing D, Arthur SN *et al*. HRT III glaucoma probability score and Moorfields regression across the glaucoma spectrum. J Glaucoma 2009; 18(5):368-72.

64 Ng M, Racette L, Pascual JP *et al*. Comparing the full-threshold and Swedish interactive thresholding algorithms for short-wavelength automated perimetry. Invest Ophthalmol Vis Sci 2009; 50(4):1726-33.

65 Polo V, Larrosa JM, Ferreras A, Mayoral F, Pueyo V, Honrubia FM. Retinal nerve fiber layer evaluation in open-angle glaucoma. Optimum criteria for optical coherence tomography. Ophthalmologica 2009; 223(1):2-6.

66 Nouri-Mahdavi K, Nikkhou K, Hoffman DC, Law SK, Caprioli J. Detection of early glaucoma with optical coherence tomography (StratusOCT). J Glaucoma 2008; 17(3):183-8.

67 Badala F, Nouri-Mahdavi K, Raoof DA, Leeprechanon N, Law SK, Caprioli J. Optic disk and nerve fiber layer imaging to detect glaucoma. Am J Ophthalmol 2007; 144(5):724-32.

68 De Leon-Ortega JE, Sakata LM, Monheit BE, McGwin G Jr, Arthur SN, Girkin CA. Comparison of diagnostic accuracy of Heidelberg Retina Tomograph II and Heidelberg Retina Tomograph 3 to discriminate glaucomatous and nonglaucomatous eyes. Am J Ophthalmol 2007; 144(4):525-32.

69 Medeiros FA, Bowd C, Zangwill LM, Patel C, Weinreb RN. Detection of glaucoma using scanning laser polarimetry with enhanced corneal compensation. Invest Ophthalmol Vis Sci 2007; 48(7):3146-53.

70 Medeiros FA, Zangwill LM, Bowd C, Sample PA, Weinreb RN. Influence of disease severity and optic disc size on the diagnostic performance of imaging instruments in glaucoma. Invest Ophthalmol Vis Sci 2006; 47(3):1008-15.

71 Lu AT, Wang M, Varma R *et al*. Combining nerve fiber layer parameters to optimize glaucoma diagnosis with optical coherence tomography. Ophthalmology 2008; 115(8):1352-7, 1357.e1-2.

72 Medeiros FA, Vizzeri G, Zangwill LM, Alencar LM, Sample PA, Weinreb RN. Comparison of retinal nerve fiber layer and optic disc imaging for diagnosing glaucoma in patients suspected of having the disease. Ophthalmology 2008; 115(8):1340-6.

73 Mai TA, Reus NJ, Lemij HG. Diagnostic accuracy of scanning laser polarimetry with enhanced versus variable corneal compensation. Ophthalmology 2007; 114(11):1988-93.

74 Hong S, Ahn H, Ha SJ, Yeom HY, Seong GJ, Hong YJ. Early glaucoma detection using the Humphrey Matrix Perimeter, GDx VCC, Stratus OCT, and retinal nerve fiber layer photography. Ophthalmology 2007; 114(2):210-5.

75 Kim NR, Hong S, Kim JH, Rho SS, Seong GJ, Kim CY. Comparison of Macular Ganglion Cell Complex Thickness by Fourier-Domain OCT in Normal Tension Glaucoma and Primary Open-Angle Glaucoma. J Glaucoma 2011.

76 Oddone F, Centofanti M, Tanga L *et al*. Influence of disc size on optic nerve head versus retinal nerve fiber layer assessment for diagnosing glaucoma. Ophthalmology 2011; 118(7):1340-7.

77 Girkin CA, Liebmann J, Fingeret M, Greenfield DS, Medeiros F. The effects of race, optic disc area, age, and disease severity on the diagnostic performance of spectral-domain optical coherence tomography. Invest Ophthalmol Vis Sci 2011; 52(9):6148-53.

78 Leite MT, Rao HL, Zangwill LM, Weinreb RN, Medeiros FA. Comparison of the diagnostic accuracies of the Spectralis, Cirrus, and RTVue optical coherence tomography devices in glaucoma. Ophthalmology 2011; 118(7):1334-9.

79 Mansoori T, Viswanath K, Balakrishna N. Quantification of retinal nerve fiber layer thickness in normal eyes, eyes with ocular hypertension, and glaucomatous eyes with SD-OCT. Ophthalmic Surg Lasers Imaging 2010; 41 Suppl:S50-7.

80 Horn FK, Mardin CY, Bendschneider D, Junemann AG, Adler W, Tornow RP. Frequency doubling technique perimetry and spectral domain optical coherence tomography in patients with early glaucoma. Eye (Lond) 2011; 25(1):17-29.

81 Shoji T, Sato H, Ishida M, Takeuchi M, Chihara E. Assessment of glaucomatous changes in subjects with high myopia using spectral domain optical coherence tomography. Invest Ophthalmol Vis Sci 2011; 52(2):1098-102.

82 Benitez-del-Castillo J, Martinez A, Regi T. Diagnostic capability of scanning laser polarimetry with and without enhanced corneal compensation and optical coherence tomography. Eur J Ophthalmol 2011; 21(3):228-36.

83 Aptel F, Sayous R, Fortoul V, Beccat S, Denis P. Structure-function relationships using spectral-domain optical coherence tomography: comparison with scanning laser polarimetry. Am J Ophthalmol 2010; 150(6):825-33.

84 Cho JW, Sung KR, Hong JT, Um TW, Kang SY, Kook MS. Detection of glaucoma by spectral domain-scanning laser ophthalmoscopy/optical coherence tomography (SD-SLO/OCT) and time domain optical coherence tomography. J Glaucoma 2011; 20(1):15-20.

85 Francis BA, Varma R, Vigen C *et al*. Population and high-risk group screening for glaucoma: the Los Angeles Latino Eye Study. Invest Ophthalmol Vis Sci 2011; 52(9):6257-64.

86 Mansberger SL, Johnson CA, Cioffi GA *et al*. Predictive value of frequency doubling technology perimetry for detecting glaucoma in a developing country. J Glaucoma 2005; 14(2):128-34.

Appendix D. ICD-9 Classification

Definition	Snellen Fractions/Decimals	Visual Fields	Clinical Assessment; Count Fingers, Hand Movement, Light Perception
NORMAL VISION	20/10 20/13 20/16 20/20 20/25 2.0 1.6 1.25 1.0 0.8		
NEAR-NORMAL VISION	20/30 20/40 20/50 20/60 0.7 0.6 0.5 0.4 0.3		
MODERATE VISUAL IMPAIRMENT	20/70 20/80 20/100 20/125 20/160 0.25 0.20 0.16 0.12		
SEVERE VISUAL IMPAIRMENT	20/200 20/250 20/320 20/400 0.10 0.08 0.06 0.05	Visual field: 20 degrees or less	
PROFOUND VISUAL IMPAIRMENT BLINDNESS	20/500 20/630 20/800 20/1000 0.04 0.03 0.025 0.02	Visual field: 10 degrees or less	Count fingers at less than 3m (10 ft)
NEAR-TOTAL VISUAL IMPAIRMENT	Visual acuity: less than 0.02	Visual field: 5 degrees or less (One or both eyes)	Both eyes: Count fingers: 1m (3 ft) or less Hand movements: 5m (15 ft) or less Light projection, light perception
TOTAL VISUAL IMPAIRMENT			Total blindness No light perception (NLP)

Visual acuity refers to best achievable acuity with correction.
Non-listed Snellen fractions may be classified by converting to the nearest decimal equivalent, e.g. 10/200 = 0.05, 6/30 = 0.20.
CF (count fingers) without designation of distance, may be classified to profound impairment.
HM (hand motion) without designation of distance, may be classified to near-total impairment.
Visual field measurements refer to the largest

Appendix E. Excluded Articles

Aasved, H. and Hovding, G The Bergen Glaucoma Study: Diagnostic criteria, epidemiology, prognostic factors and indications for treatment. CHIBRET INT. J. OPHTHALMOL. 87; 5 (3): 4-19.

Does not address any key questions

Abakumova, L. I. a., Nesterov, A. P., Mitkokh, D. I., and Sushkova, O. P [Statistical analysis of data from glaucoma examinations]. Med Tekh 79; (6): 16-20.

Foreign language

Abdel-Ghafar, R. A. and Morris, T Progress towards automated detection and characterization of the optic disc in glaucoma and diabetic retinopathy. Med Inform Internet Med 2007; 32 (1): 19-25.

Data not abstractable

Abdul Majid, A. S., Kwag, J. H., Jung, S. H., Yim, H. B., Kim, Y. D., and Kang, K. D Correlation between disc damage likelihood scale and optical coherence tomography in the diagnosis of glaucoma. Ophthalmologica 2010; 224 (5): 274-82.

Testing in-house scoring system only

Abraham-Cohen, J. A, Bass, S. J, Feldman, J., and Wyatt, H HUMPHREY SITA VS OCTOPUS TOP IN GLAUCOMA PATIENTS.American Academy of Optometry 99; 176.

Abstract only

Accornero, N., Capozza, M., De Feo, A., Rinalduzzi, S., De Marinis, M., Pecori-Giraldi, J., Mollicone, A., and Volante, V Video color perimetry: impairment in glaucoma suspects. Doc Ophthalmol 2001; 103 (2): 81-90.

Does not address any key questions

Adachi, M. and Shirato, S The usefulness of the Noise-Field Test as a screening method for visual field defects. JPN. J. OPHTHALMOL. 94; 38 (4): 392-399.

Does not address any key questions

Adler, W., Warntges, S., Lausen, B., and Michelson, G [Prevalence of glaucomatous optic nerve atrophy among a working population in Germany diagnosed by a telemedical approach]. Klin Monbl Augenheilkd 2010; 227 (11): 905-11.

Foreign language

Agbeja-Baiyeroju, A. M., Bekibele, C. O., Bamgboye, E. A., Omokhodion, F., and Oluleye, T. S The Ibadan glaucoma study Afr J Med Med Sci 2003; 32 (4): 371-376.

Other (specify): not all subjects given definitive exam

Agbeja-Baiyeroju, A. M., Bekibele, C. O., Bamgboye, E. A., Omokhodion, F., and Oluleye, T. S The Ibadan glaucoma study Afr J Med Med Sci 2003; 32 (4): 371-376.

Unspecified diagnosis of Glaucoma

Ahn, B.-S. and Kee, C Ability of a confocal scanning laser ophthalmoscope (TopSS) to detect early glaucomatous visual field defect. Br. J. Ophthalmol. 2000; 84 (8): 852-855.

Infrequently used device: TopSS

Ahnoux-Zabsonre, A., Keita, C., Safede, K., and Tanoe, A [Prevalence of primary chronic open-angle glaucoma in Ivory Coast]. J Fr Ophtalmol 98; 21 (9): 643-7.

Does not address any key questions

Alberta Heritage Foundation for Medical Research. Confocal scanning laser ophthalmoscopy and scanning laser polarimetry for early diagnosis of glaucoma

Brief Record

Edmonton: Alberta Heritage Foundation for Medical Research (AHFMR) 2006; 42.

Brief Record

Alembn, Edgardo, Celis, Vanessa, and Dreyer, M nica. Campimetria computarizada con el analizador de campos visuales humphrey: estudio de 350 casos. Centro mqd 97; 42 (2): 92-4.

Foreign language

Alencar, L. M., Bowd, C., Weinreb, R. N., Zangwill, L. M., Sample, P. A., and Medeiros, F. A Comparison of HRT-3 glaucoma probability score and subjective stereophotograph assessment for prediction of progression in glaucoma. Invest Ophthalmol Vis Sci 2008; 49 (5): 1898-906.

Does not address any key questions

Alias Alegre, E. G., Ferreras, A., Polo, V., Larrosa, J. M., Pueyo, V., and Honrubia, F. M Importance of central corneal thickness when studying ocular hypertensive eyes, glaucoma suspects and preperimetric glaucomatous eyes: Importancia del espesor corneal central en el estudio de hipertensos oculares, sospechosos de glaucoma y glaucomas preperimetricos. Arch. Soc. Esp. Oftalmol. 2007; 82 (10): 615-621.

Foreign language

Alias, E. G., Ferreras, A., Polo, V., Larrosa, J. M., Pueyo, V., and Honrubia, F. M [Importance of central corneal thickness when studying ocular hypertensive eyes, glaucoma suspects and preperimetric glaucomatous eyes]. Arch Soc Esp Oftalmol 2007; 82 (10): 615-21.

Does not address any key questions

Allen, C. S., Sponsel, W. E., Trigo, Y., Dirks, M. S., and Flynn, W. J Comparison of the frequency doubling technology screening algorithm and the Humphrey 24-2 SITA-FAST in a large eye screening. Clin Experiment Ophthalmol 2002; 30 (1): 8-14.

Does not use clinical assessment as reference standard

Allingham, R. R., Loftsdottir, M., Gottfredsdottir, M. S., Thorgeirsson, E., Jonasson, F., Sverisson, T., Hodge, W. G., Damji, K. F., and Stefansson, E Pseudoexfoliation syndrome in Icelandic families. Br J Ophthalmol 2001; 85 (6): 702-7.

Does not address any key questions

Almeida GVd, Mandia J•nior C, Paolera MD et al. ImportGncia da perimetria de dupla freqnWncia na detecgPo do glaucoma: rastreamento em funcionbrios de hospital p•blico numa brea urbana de SPo Paulo. Arq. Bras. Oftalmol 2005; 68(1):49-53.

Foreign language

Almeida GVd. Campimetria e pressåo intra-ocular. An. Oftalmol 1986; 5(1):9-15.

Foreign language

Almeida PBd, Almeida GVd, Cohen R, Prata J•nior JA, Melo PAdA. Correla gåo e correspondWncia topogrbfica entre espessura da camada de fibras nervosas da retina e campo visual no glaucoma prim brio de Gngulo aberto. Arq. Bras. Oftalmol 2001; 64(2):109-15.

Foreign language

Altangerel, U., Nallamshetty, H. S., Uhler, T., Fontanarosa, J., Steinmann, W. C., Almodin, J. M., Chen, B. H., and Henderer, J. D Knowledge about glaucoma and barriers to follow-up care in a community glaucoma screening program. Can J Ophthalmol 2009; 44 (1): 66-9**.**

Does not address any key questions

Andrada, M. T., Bernaldo De Quiros, P., Villegas, R. S., and Anton, A [Diagnostic accuracy of frequency doubling perimetry]. Arch Soc Esp Oftalmol 2001; 76 (12): 711-8.

Foreign language

Andreou, P. A., Wickremasinghe, S. S., Asaria, R. H., Tay, E., and Franks, W. A A comparison of HRT II and GDx imaging for glaucoma detection in a primary care eye clinic setting. Eye (Lond) 2007; 21 (8): 1050-5.

Foreign language

Anicho, U. M and Yager, D A SIMPLE, LOW-COST SLIDE-BASED STATIC (SBS) PERIMETER FOR THE SCREENING OF GLAUCOMA: PRELIMINARY EVALUATION. American Academy of Optometry 99; : 251.

Abstract only

Armaly, M. F Ocular pressure and visual fields. A ten-year follow-up study. Arch Ophthalmol 69; 81 (1): 25-40**.**

Does not address any key questions

Armaly, M. F The visual field defect and ocular pressure level in open angle glaucoma. Invest Ophthalmol 69; 8 (1): 105-24**.**

Does not address any key questions

Armaly, M. F The visual field defect and ocular pressure level in open angle glaucoma. Invest Ophthalmol 69; 8 (1): 105-24**.**

Does not examine candidate screening tests for glaucoma

Artes, P. H, Iwase, A., Ohno, Y., Kitazawa, Y., and Chauhan, B. C. Properties of perimetric threshold estimates from Full Threshold, SITA Standard, and SITA Fast strategies. Invest Ophthalmol Vis Sci 2002; 43 (8): 2654-9**.**

Does not address any key questions

Artes, P. H., Hutchison, D. M., Nicolela, M. T., LeBlanc, R. P., and Chauhan, B. C Threshold and variability properties of matrix frequency-doubling technology and standard automated perimetry in glaucoma. Invest Ophthalmol Vis Sci 2005; 46 (7): 2451-7**.**

Data not abstractable

Arthur, S. N., Aldridge, A. J., De Leon-Ortega, J., McGwin, G., Xie, A., and Girkin, C. A Agreement in assessing cup-to-disc ratio measurement among stereoscopic optic nerve head photographs, HRT II, and Stratus OCT. J Glaucoma 2006; 15 (3): 183-9**.**

Data not abstractable

Asaoka, R., Ishii, R., Kyu, N., Hotta, Y., and Sato, M Early detection of thinning of retinal nerve fiber layer in glaucomatous eyes by optical coherence tomography 3000: analysis of retinal nerve fiber layer corresponding to the preserved hemivisual field. Ophthalmic Res 2006; 38 (1): 29-35**.**

Data not abstractable

Asman, P. and Fingeret, M Comparison of diagnostic performance and fixation control of two automated perimeters. Journal of the American Optometric Association 97; 68 (12): 763-8**.**

Infrequently used device

Asman, P., Britt, J. M., Mills, R. P., and Heijl, A Evaluation of adaptive spatial enhancement in suprathreshold visual field screening. Ophthalmology 88; 95 (12): 1656-62**.**

Infrequently used device: Unusual visual field strategy

Astrom, S. and Linden, C Incidence and prevalence of pseudoexfoliation and open-angle glaucoma in northern Sweden: I. Baseline report. Acta Ophthalmol. Scand. 2007; 85 (8): 828-831**.**

Does not address any key questions

Astrom, S., Stenlund, H., and Linden, C Incidence and prevalence of pseudoexfoliations and open-angle glaucoma in northern Sweden: II. Results after 21 years of follow-up. Acta Ophthalmol. Scand. 2007; 85 (8): 832-837**.**

Does not address any key questions

Aue, A. , Geitzenauer, W., Hirn, C., Bolz, M., Ahlers, C., Leydolt, C. Comparison of Retinal Thickness Measures Obtained by STRATUS®-OCT and HD-OCT in Normal and Glaucoma Eyes. IOVS 2007; 48: ARVO E-Abstract 513.

Abstract only

Austin, M. W., O'Brien, C. J., and Wishart, P. K Flicker perimetry using a luminance threshold strategy at frequencies from 5-25 Hz in glaucoma, ocular hypertension and normal controls. CURR. EYE RES. 94; 13 (10): 717-723**.**

Does not address any key questions

Babel, J. and Vali, M [Detection of glaucoma and the organization of consultative services for glaucoma patients]. Rev Med Suisse Romande 70; 90 (11): 861-8.

Foreign language

Bagga, H. and Greenfield, D. S Quantitative assessment of structural damage in eyes with localized visual field abnormalities. Am J Ophthalmol 2004; 137 (5): 797-805**.**

Data not abstractable

Bagga, H. and Greenfield, D. S Quantitative assessment of structural damage in eyes with localized visual field abnormalities. Am J Ophthalmol 2004; 137 (5): 797-805**.**

Does not address any key questions

Bagga, H., Greenfield, D. S., and Feuer, W. J Quantitative assessment of atypical birefringence images using scanning laser polarimetry with variable corneal compensation. Am J Ophthalmol 2005; 139 (3): 437-46**.**

Does not address any key questions

Bagga, H., Greenfield, D. S., Feuer, W., and Knighton, R. W Scanning laser polarimetry with variable corneal compensation and optical coherence tomography in normal and glaucomatous eyes. Am J Ophthalmol 2003; 135 (4): 521-9**.**

Does not address any key questions

Bai, Z.-L., Ren, B.-C., He, Y., Yang, J.-G., Chen, L., and Sun, N.-X Epidemiology of primary open angle glaucoma in a rural population in Shaanxi Province of China. Int. J. Ophthalmol. 2005; 5 (5): 864-871.

Foreign language

Bai, Z.-L., Ren, B.-C., Yang, J.-G., He, Y., Chen, L., and Sun, N.-X Systemic blood pressure, intraocular pressure and primary open-glaucoma: A population-based study in Shaanxi Province of China. Int. J. Ophthalmol. 2005; 5 (6): 1122-1127.

Foreign language

Balazsi, A. G., Saheb, N. E., Kasner, O. P., Overbury, O., and Faubert, J THE EFFECTS OF TIMOLOL MALEATE ON STATIC VISUAL FIELDS, TEMPORAL MODULATION FIELDS, AND SPATIAL CONTRAST SENSITIVITY IN EARLY GLAUCOMA. IOVS 91; 32 : ARVO abstraact 2151.
Abstract only

Bandyopadhyay, M., Raychaudhuri, A., Lahiri, S. K., Schwartz, E. C., Myatt, M., and Johnson, G. J Comparison of Goldmann applanation tonometry with the Tonopen for measuring intraocular pressure in a population-based glaucoma survey in rural West Bengal. Ophthalmic Epidemiol 2002; 9 (3): 215-24**.**
Does not address any key questions

Bandyopadhyay, M., Raychaudhuri, A., Lahiri, S. K., Schwartz, E. C., Myatt, M., and Johnson, G. J Comparison of Goldmann applanation tonometry with the Tonopen for measuring intraocular pressure in a population-based glaucoma survey in rural West Bengal. Ophthalmic Epidemiol 2002; 9 (3): 215-24**.**
Other (specify): reliability only

Baraibar, B., Sanchez-Cano, A., Pablo, L. E., and Honrubia, F. M Preperimetric glaucoma assessment with scanning laser polarimetry (GDx VCC): analysis of retinal nerve fiber layer by sectors. J Glaucoma 2007; 16 (8): 659-64**.**
Does not use clinical assessment as reference standard

Barleon, L., Hoffmann, E. M., Berres, M., Pfeiffer, N., and Grus, F. H Comparison of dynamic contour tonometry and goldmann applanation tonometry in glaucoma patients and healthy subjects. Am J Ophthalmol 2006; 142 (4): 583-90**.**
Data not abstractable

BarrÆa Von Bischoffshausen F, Vigueras Chi. J, Riquelme R. A, Grant I. V. An blisis del perÆmetro de doble frecuencia como mqtodo diagn£stico en la pesquisa del glaucoma. Arch. Chil. Oftalmol 2000; 57(2):47-56.
Foreign language

Bass, S. J, Cooper, J., Feldman, J., and Horn, D A NEW AUTOMATED CONFRONTATION TESTING DEVICE VS. FINGER COUNTING IN THE DETECTION OF FIELD LOSS IN GLAUCOMA. IOVS 2004; 45 : ARVO E-abstract 4507.
Abstract only

Bassi, C. J., Galanis, J. C., and Hoffman, J Comparison of the Farnsworth-Munsell 100-Hue, the Farnsworth D-15, and the L'Anthony D-15 desaturated color tests. ARCH OPHTHALMOL 93; 111 (5): 639-641**.**
Does not address any key questions

Bassi, C. J., Galanis, J. C., and Hoffman, J Comparison of the Farnsworth-Munsell 100-Hue, the Farnsworth D-15, and the L'Anthony D-15 desaturated color tests. ARCH OPHTHALMOL 93; 111 (5): 639-641**.**
Does not examine candidate screening tests for glaucoma

Bathija, R., Zangwill, L., Berry, C. C., Sample, P. A., and Weinreb, R. N Detection of early glaucomatous structural damage with confocal scanning laser tomography. J Glaucoma 98; 7 (2): 121-7**.**
Infrequently used device: HRT1

Bayraktar, S. and Bayraktar, Z Central corneal thickness and intraocular pressure relationship in eyes with and without previous LASIK: comparison of Goldmann applanation tonometer with pneumatonometer. Eur J Ophthalmol 2005; 15 (1): 81-8**.**
Does not address any key questions

Belen'kii, K. R [Pre-glaucoma]. Oftalmol Zh 75; 30 (4): 275-7.
Foreign language

Bella-Hiag, A. L., Ebana Mvogo, C., Ngosso, A., and Ellong, A [Intraocular pressure in a young Cameroonian population]. J Fr Ophtalmol 96; 19 (10): 585-90.
Foreign language

Bellios, N., Horn, F. K., Lammer, R., Gottschalk, K., Dehne, K., Ruhl, S., and Junemann, A. G [Peripheral suprathreshold stimulation in preperimetric glaucoma]. Ophthalmologe 2008; 105 (7): 656-60.
Foreign language

Beneyto, P., Barajas, M. A., Garcia-de-Blas, F., Del Cura, I., Sanz, T., Vello, R., and Salvador, C Predictive value of tonometry with Tono-pen XL in primary care. Br J Gen Pract 2007; 57 (541): 653-4**.**
Does not address any key questions

Bengtsson, B. and Heijl, A Diagnostic sensitivity of fast blue-yellow and standard automated perimetry in early glaucoma: a comparison between different test programs. Ophthalmology 2006; 113 (7): 1092-7**.**
Does not address any key questions

Bengtsson, B. and Heijl, A Diurnal IOP fluctuation: not an independent risk factor for glaucomatous visual field loss in high-risk ocular hypertension. Graefes Arch Clin Exp Ophthalmol 2005; 243 (6): 513-8**.**
Does not address any key questions

Bengtsson, B. M. and Heijl, A SITA SWAP, a New Rapid Threshold Testing Strategy for Blue-On-Yellow Perimetry. IOVS 2003; : ARVO E-abstract 52.
Abstract only

Bengtsson, B. O Incidence of manifest glaucoma. Br J Ophthalmol 89; 73 (7): 483-7**.**
Does not address any key questions

Bengtsson, B., Leske, M. C., Hyman, L., and Heijl, A Fluctuation of intraocular pressure and glaucoma progression in the early manifest glaucoma trial. Ophthalmology 2007; 114 (2): 205-9**.**
Does not address any key questions

Bengtsson, B A new rapid threshold algorithm for short-wavelength automated perimetry. Invest Ophthalmol Vis Sci 2003; 44 (3): 1388-94**.**
Does not address any key questions

Bengtsson, B Characteristics of manifest glaucoma at early stages. Graefes Arch Clin Exp Ophthalmol 89; 227 (3): 241-3**.**
Does not address any key questions

Bengtsson, B Glaucoma case detection. Acta Ophthalmol (Copenh) 91; 69 (3): 288-92**.**
Does not address any key questions

Bengtsson, B The prevalence of glaucoma. Br J Ophthalmol 81; 65 (1): 46-9**.**
Does not address any key questions

Bernardi L, Costa VP, Mutton F, Kara Josq N. Campos visuais nåo-confibveis em pacientes glaucomatosos ou com suspeita de glaucoma: uma anblise dos fatores de risco. Arq. Bras. Oftalmol 1999; 62(1):56-66.
Foreign language

Bernardin, P., Rabeantoandro, H., Ratsimbazafy, J., and Rasikindrahona, E New epidemiologic approach to intraocular pressure in an Antananarivo population: Nouvelle approche epidemiologique de la tension oculaire dans une population d'Antananarivo. J. Fr. Ophtalmol. 2001; 24 (1): 21-28**.**

Does not address any key questions

Beynat, J., Charles, A., Soulie, M., Metral, P., Creuzot-Garcher, C., and Bron, A. M Combined glaucoma and diabetic retinopathy screening in Burgundy: Depistage itinerant du glaucome associe a celui de la retinopathie diabetique en Bourgogne J Fr Ophtalmol 2008; 31 (6 Pt 1): 591-596**.**

Does not address any key questions

Bhatt, N., Bhojwani, R., Morrison, A., Kwartz, J., Laiquzzaman, M., and Shah, S A 10-year follow up of ocular hypertensive patients within the Bolton Corneal Thickness Study. Can measured factors predict prognostic outcomes?. Cont Lens Anterior Eye 2008; 31 (3): 147-53**.**

Does not address any key questions

Bjerre, A., Henson, D. B., Grigg, J. R., and Parry, N. R. A Test-Retest Variability of Multifocal Visual Evoked Potential and SITA Standard Perimetry. IOVS 2003; 44 : ARVO E-abstract 28.

Abstract only

Blumenthal, E. Z., Sample, P. A., Berry, C. C., Lee, A. C., Girkin, C. A., Zangwill, L., Caprioli, J., and Weinreb, R. N Evaluating several sources of variability for standard and SWAP visual fields in glaucoma patients, suspects, and normals. Ophthalmology 2003; 110 (10): 1895-902**.**

Does not address any key questions

Bobeico, V., Zemba, M., Bratulescu, M., Ciuca, C., and Popescu, M [Blue-yellow full threshold automated perimetry in glaucoma diagnosis]. Oftalmologia 2002; 55 (4): 18-24.

Foreign language

Bodis-Wollner, I. and Brannan, J. R Hidden visual loss in optic neuropathy is revealed using gabor patch contrast perimetry. CLIN. NEUROSCI. 97; 4 (5): 284-291**.**

Does not address any key questions

Boiko, E. V., Simakova, I. L., Kuz'micheva, O. V., Mechetin, A. A., Tselomudryi, A. I., and Filina, E. V [High-technological screening for glaucoma]. Voen Med Zh 2010; 331 (2): 23-6.

Foreign language

Bolla, N., Savio, E., Bellone, A., Palanza, L., Favero, C., and Brogliatti, B The Draeger autotonometer: its advantages and limits. Acta Ophthalmol Scand Suppl 98; (227): 21-2**.**

Does not address any key questions

Bonomi, L., Marchini, G., Marraffa, M., and Morbio, R The relationship between intraocular pressure and glaucoma in a defined population. Data from the Egna-Neumarkt Glaucoma Study. Ophthalmologica 2001; 215 (1): 34-8**.**

Other: not all subjects received exam for glaucoma

Bonomi, L., Marchini, G., Marraffa, M., Bernardi, P., De Franco, I., Perfetti, S., Varotto, A., and Tenna, V Prevalence of glaucoma and intraocular pressure distribution in a defined population. The Egna-Neumarkt Study. Ophthalmology 98; 105 (2): 209-15**.**

Does not address any key questions

Borges KF. Anblise com Heidelberg Retina Tomograph da espessura da camada de fibras nervosas retinianas e do volume de escavagåo papilar em zonas alfa e beta de atrofia para-papilar em pacientes glaucomatosos. Rev. Bras. Oftalmol 2000; 59(3):204-8.

Foreign language

Borges KF. Anblise esteriomqtrica do disco £ptico comHeildelberg Retina Tomograph (HRT) em pacientes com Glaucoma de Tensåo Normal (GNT). Rev. Bras. Oftalmol 1999; 58(6):459-62.

Foreign language

Borque, E., Ferreras, A., Polo, V., Larrosa, J. M., Alias, E., and Honrubia, F. M [Evaluation of four new discriminant functions for HRT II in glaucoma diagnosis]. Arch Soc Esp Oftalmol 2008; 83 (6): 349-56.

Foreign language

Borque, E., Ferreras, A., Polo, V., Larrosa, J. M., Pablo, L. E., and Honrubia, F. M [Diagnostic ability of GDx VCC for glaucoma diagnosis]. Arch Soc Esp Oftalmol 2008; 83 (6): 357-64.

Foreign language

Borque, E., Pueyo, V., Polo, V., Larrosa, J., Ferreras, A., and Honrubia, F Diagnostic Ability of the Heidelberg Retina Tomograph, Optical Coherence Tomography and Laser Polarimetry to Detect Structural Damage in Glaucoma. IOVS 2006; 47 : ARVO E-abstract 3626.

Abstract only

Bosworth, C. F., Sample, P. A., Gupta, N., Bathija, R., and Weinreb, R. N Motion automated perimetry identifies early glaucomatous field defects. Arch Ophthalmol 98; 116 (9): 1153-8**.**

Non-commercially available analysis of data

Bourne, R. R., Medeiros, F. A., Bowd, C., Jahanbakhsh, K., Zangwill, L. M., and Weinreb, R. N Comparability of retinal nerve fiber layer thickness measurements of optical coherence tomography instruments. Invest Ophthalmol Vis Sci 2005; 46 (4): 1280-5**.**

Does not use clinical assessment as reference standard

Bowd, C., Hao, J., Tavares, I. M., Medeiros, F. A., Zangwill, L. M., Lee, T. W., Sample, P. A., Weinreb, R. N., and Goldbaum, M. H Bayesian machine learning classifiers for combining structural and functional measurements to classify healthy and glaucomatous eyes. Invest Ophthalmol Vis Sci 2008; 49 (3): 945-53**.**

Non-commercially available analysis of data

Bowd, C., Medeiros, F. A., Zhang, Z., Zangwill, L. M., Hao, J., Lee, T. W., Sejnowski, T. J., Weinreb, R. N., and Goldbaum, M. H Relevance vector machine and support vector machine classifier analysis of scanning laser polarimetry retinal nerve fiber layer measurements. Invest Ophthalmol Vis Sci 2005; 46 (4): 1322-9**.**

Does not use clinical assessment as reference standard

Bowd, C., Vizzeri, G., Tafreshi, A., Zangwill, L. M., Sample, P. A., and Weinreb, R. N Diagnostic accuracy of pattern electroretinogram optimized for glaucoma detection. Ophthalmology 2009; 116 (3): 437-43**.**

Does not examine candidate screening tests for glaucoma

Bowd, C., Weinreb, R. N., Williams, J. M., and Zangwill, L. M The retinal nerve fiber layer thickness in ocular hypertensive, normal, and glaucomatous eyes with optical coherence tomography. Arch Ophthalmol 2000; 118 (1): 22-6.

Does not address any key questions

Bowd, C., Zangwill, L. M., Berry, C. C., Blumenthal, E. Z., Vasile, C., Sanchez-Galeana, C., Bosworth, C. F., Sample, P. A., and Weinreb, R. N Detecting early glaucoma by assessment of retinal nerve fiber layer thickness and visual function. Invest Ophthalmol Vis Sci 2001; 42 (9): 1993-2003.

Infrequently used device: GDX-OCT

Bowling, B., Chen, S. D., and Salmon, J. F Outcomes of referrals by community optometrists to a hospital glaucoma service. Br J Ophthalmol 2005; 89 (9): 1102-4.

Does not address any key questions

Bozkurt, B., Irkec, M., Karaagaoglu, E., and Orhan, M Scanning laser polarimetric analysis of retinal nerve fiber layer thickness in Turkish patients with glaucoma and ocular hypertension. Eur J Ophthalmol 2002; 12 (5): 406-12.

Other (specify): outdated device

Bozkurt, B., Ylmaz, P. T., and Irkec, M Relationship between Humphrey 30-2 SITA standard test, matrix 30-2 threshold test, and Heidelberg Retina Tomograph in ocular hypertensive and glaucoma patients. J. Glaucoma 2008; 17 (3): 203-210.

Does not address any key questions

Brogliatti, B., Boles Carenini, A., Bogetto, C., Vadala, G., Grignolo, F. M., and Boles Carenini, B Ibopamine test in healthy and glaucomatous eyes: Tonometric and pupillographic study. Acta Ophthalmol. Scand. Suppl. 2000; 78 (232): 13-14.

Does not address any key questions

Bron, A., Baudouin, C., Nordmann, J. P., Rouland, J. F., Thomas, F., Bean, K., De Clercq, B., Benetos, A., de Gendre, A. S., and Lefebvre, S [Prevalence of intraocular hypertension and glaucoma in a nonselected French population]. J Fr Ophtalmol 2006; 29 (6): 635-41.

Foreign language

Brusini, P., Salvetat, M. L., Parisi, L., and Zeppieri, M Probing glaucoma visual damage by rarebit perimetry. Br J Ophthalmol 2005; 89 (2): 180-4.

Testing in-house scoring system only

Brusini, P., Salvetat, M. L., Zeppieri, M., and Parisi, L Frequency doubling technology perimetry with the Humphrey Matrix 30-2 test. J Glaucoma 2006; 15 (2): 77-83.

Non-commercially available analysis of data

Brusini, P., Tosoni, C., Parisi, L., and Rizzi, L Ocular hypertension and corneal thickness: a long-term prospective study. Results after two years. Eur J Ophthalmol 2005; 15 (5): 550-5.

Does not address any key questions

Brusini, P., Zeppieri, M., Tosoni, C., Parisi, L., and Salvetat, M. L Optic disc damage staging system. J Glaucoma 2010; 19 (7): 442-9.

Non-commercially available analysis of data

Brusini, P., Zeppieri, M., Tosoni, C., Parisi, L., Felletti, M., and Salvetat, M. L Stratus-OCT imaging in early glaucomatous and in ocular hypertensive patients with and without frequency-doubling technology abnormalities. Eye (Lond) 2008; 22 (3): 406-13.

Data not abstractable

Budenz, D. L., Anderson, D. R., Feuer, W. J., Beiser, J. A., Schiffman, J., Parrish, R. K. 2nd, Piltz-Seymour, J. R., Gordon, M. O., and Kass, M. A Detection and prognostic significance of optic disc hemorrhages during the Ocular Hypertension Treatment Study. Ophthalmology 2006; 113 (12): 2137-43.

Does not address any key questions

Budenz, D. L., Michael, A., Chang, R. T., McSoley, J., and Katz, J Sensitivity and specificity of the StratusOCT for perimetric glaucoma. Ophthalmology 2005; 112 (1): 3-9.

Data not abstractable

Buhrmann, R. R., Quigley, H. A., Barron, Y., West, S. K., Oliva, M. S., and Mmbaga, B. B Prevalence of glaucoma in a rural East African population. Invest Ophthalmol Vis Sci 2000; 41 (1): 40-8.

Does not address any key questions

Buhrmann, R. R., Quigley, H. A., Barron, Y., West, S. K., Oliva, M. S., and Mmbaga, B. B Prevalence of glaucoma in a rural East African population. Invest Ophthalmol Vis Sci 2000; 41 (1): 40-8.

Other (specify): prevalence

Burgansky-Eliash, Z., Wollstein, G., Chu, T., Ramsey, J. D., Glymour, C., Noecker, R. J., Ishikawa, H., and Schuman, J. S Optical coherence tomography machine learning classifiers for glaucoma detection: a preliminary study. Invest Ophthalmol Vis Sci 2005; 46 (11): 4147-52.

Non-commercially available analysis of data

Burk, R. O. W., Konig, J., Rohrschneider, K., Noack, H., and Volcker, H. E Three-dimensional optic disc topography by laser scanning tomography: Clinical correlation of a cluster analysis: DREIDIMENSIONALE PAPILLENTOPOGRAPHIE MITTELS LASER SCANNING TOMOGRAPHIE: KLINISCHES KORRELAT EINER CLUSTER-ANALYSE. KLIN. MONATSBL. AUGENHEILKD. 94; 204 (6): 504-512.

Foreign language

Burk, R. O., Konig, J., Rohrschneider, K., Noack, H., and Volcker, H. E [3-dimensional topography of the optic papilla with laser scanning tomography: clinical correlation of cluster analysis]. Klin Monbl Augenheilkd 94; 204 (6): 504-12.

Foreign language

Burr, J. M., Campbell, M. K., Campbell, S. E., Francis, J. J., Greene, A., Hernandez, R., Hopkins, D., McCann, S. K., and Vale, L. D Developing the clinical components of a complex intervention for a glaucoma screening trial: a mixed methods study. BMC Med Res Methodol 2011; 11 : 54.

Data not abstractable

Byles, D. B., Sherafat, H., and Diamond, J. P Frequency Doubling Technology screening test in glaucoma detection. IOVS 2000; 41 : ARVO Abstract 452.

Abstract only

Calixto N, Cronemberger S. Glaucoma simples x glaucoma agudo: estudo eco-biom qtrico. Arq. Bras. Oftalmol 1986; 49(1):1-8.

Foreign language

Caprioli, J. and Coleman, A Pressure fluctuation. Ophthalmology 2009; 116 (4): 817.

No original data (e.g., systematic review, narrative review, editorial, letter)

Caprioli, J. and Coleman, A Pressure fluctuation. Ophthalmology 2009; 116 (4): 817.
Other (specify): this is a letter to the editor

Casson, E. J., Johnson, C. A., and Shapiro, L. R Longitudinal comparison of temporal-modulation perimetry with white-on-white and blue-on-yellow perimetry in ocular hypertension and early glaucoma. J Opt Soc Am A Opt Image Sci Vis 93; 10 (8): 1792-806.
Does not address any key questions

Casson, R. J., Newland, H. S., Muecke, J., McGovern, S., Abraham, L., Shein, W. K., Selva, D., and Aung, T Prevalence of glaucoma in rural Myanmar: the Meiktila Eye Study. Br J Ophthalmol 2007; 91 (6): 710-4.
Does not address any key questions

Casson, R., James, B., Rubinstein, A., and Ali, H Clinical comparison of frequency doubling technology perimetry and Humphrey perimetry. Br J Ophthalmol 2001; 85 (3): 360-2.
Does not use clinical assessment as reference standard

Cellini, M., Bernabini, B., Carbonelli, M., Zamparini, E., and Campos, E. C Optical coherence tomography, frequency-doubling technology, and colour Doppler imaging in ocular hypertension. Eye (Lond) 2007; 21 (8): 1071-7.
It does not address the adequate population

Ceruti, P., Morbio, R., Marraffa, M., and Marchini, G Comparison of Goldmann applanation tonometry and dynamic contour tonometry in healthy and glaucomatous eyes. Eye (Lond) 2009; 23 (2): 262-9.
Data not abstractable

Chang, Y. C. and Tsai, R. K Correlation between quadrant specific automatic visual field defect and retinal nerve fiber layer thickness as measured by scanning laser polarimetry in patients with primary open angle glaucoma. Kaohsiung J Med Sci 2008; 24 (5): 233-9.
Other (specify): GDX

Chauhan, B. C., House, P. H., McCormick, T. A., and LeBlanc, R. P Comparison of conventional and high-pass resolution perimetry in a prospective study of patients with glaucoma and healthy controls. Arch Ophthalmol 99; 117 (1): 24-33.
Does not examine candidate screening tests for glaucoma

Chen, H. Y. and Huang, M. L Discrimination between normal and glaucomatous eyes using Stratus optical coherence tomography in Taiwan Chinese subjects. Graefes Arch Clin Exp Ophthalmol 2005; 243 (9): 894-902.
Does not use clinical assessment as reference standard

Chen, H. Y., Huang, M. L., and Hung, P. T Logistic regression analysis for glaucoma diagnosis using Stratus Optical Coherence Tomography. Optom Vis Sci 2006; 83 (7): 527-34.
Non-commercially available analysis of data

Chen, X. M., Wu, Z. Z., and Jiang, Y. Q Automatic perimetry in detecting early glaucomatous visual field defects. A follow-up study. Chin Med J (Engl) 92; 105 (4): 298-301.
Does not address any key questions

Chen, X. M [Frequency distribution of earliest glaucomatous visual field defects]. Zhonghua Yan Ke Za Zhi 92; 28 (4): 206-8.
Foreign language

Cheng, Y.-C. and Duan, X.-C Application of retinal nerve fiber layer thickness detected by HRT- II and OCT3 in early diagnosis of primary open angle glaucoma. Int. J. Ophthalmol. 2007; 7 (4): 1022-1024.
Foreign language

Chiselita, D., Crenguta, M. I., Danielescu, C., and Mihaela, N. M [A comparative analysis of standard automated perimetry and short wavelength automated perimetry in early diagnosis of glaucoma]. Oftalmologia 2006; 50 (2): 94-102.
Foreign language

Chiselita, D., Danielescu, C., Gagos-Zaharia, O., and Gherman, C [Central thickness of the cornea in ocular hypertension and open-angle glaucoma]. Oftalmologia 2007; 51 (3): 98-103.
Foreign language

Choplin, N. T. and Lundy, D. C The sensitivity and specificity of scanning laser polarimetry in the detection of glaucoma in a clinical setting. Ophthalmology 2001; 108 (5): 899-904.
Infrequently used device: outdated devices

Chopra, V., Varma, R., Francis, B. A., Wu, J., Torres, M., and Azen, S. P Type 2 diabetes mellitus and the risk of open-angle glaucoma the Los Angeles Latino Eye Study. Ophthalmology 2008; 115 (2): 227-232.e1.
Does not address any key questions

Christoffersen, T., Holtedahl, K., Fors, T., and Ringberg, U Tonometry in the general practice setting (II): Which cut-off point for referral--for which patients?. Acta Ophthalmol (Copenh) 93; 71 (1): 109-13.
Does not address any key questions

Cioffi, G. A., Mansberger, S., Spry, P., Johnson, C., and Van Buskirk, E. M Frequency doubling perimetry and the detection of eye disease in the community. Trans Am Ophthalmol Soc 2000; 98 : 195-9; discussion 199-202.
Other: not looking only at POAG

Clement, C. I., Goldberg, I., Healey, P. R., and Graham, S Humphrey matrix frequency doubling perimetry for detection of visual-field defects in open-angle glaucoma. Br J Ophthalmol 2009; 93 (5): 582-8.
Does not address any key questions

Coffey, M., Reidy, A., Wormald, R., Xian, W. X., Wright, L., and Courtney, P Prevalence of glaucoma in the west of Ireland. BR. J. OPHTHALMOL. 93; 77 (1): 17-21.
Does not address any key questions

Comegno PEC, Costa VP, Silva SARF, Kara-Josq N. Perimetria computadorizada em pacientes glaucomatosos com visåo sub-normal. Arq. Bras. Oftalmol 1995; 58(5):346-53.
Foreign language

ComparagPo de mqtodos de imagem do disco £ptico e da camada de fibras nervosas da retina para o diagn £stico do glaucoma SPo Paulo: s.n, 2005.
Book Chapter

Congdon, N. G., Quigley, H. A., Hung, P. T., Wang, T. H., Ho, T. C., and Glovinsky, Y Impact of age, various forms of cataract, and visual acuity on whole- field scotopic sensitivity screening for glaucoma in rural Taiwan. ARCH. OPHTHALMOL. 95; 113 (9): 1138-1143.
Does not address any key questions

Cooper, R. L., Grose, G. C., and Constable, I. J Mass screening of the optic disc for glaucoma: a follow-up study. Aust N Z J Ophthalmol 86; 14 (1): 35-9.
Does not address any key questions

Corallo, G., Iester, M., Scotto, R., Calabria, G., and Traverso, C. E Rarebit perimetry and frequency doubling technology in patients with ocular hypertension. Eur J Ophthalmol 2008; 18 (2): 205-11.
Infrequently used device

Correnti, A. J, Wollstein, G., Price, L. L, and Schuman, J. S. Optic Nerve Head Assessment with Discam, Heidelberg Retina Tomography, and Stereoscopic Disc Photography. American Academy of Ophthalmology 2002; : 253.
Abstract only

Costa RMdS, Velasco TR, Costa LS, Rodrigues MdLV. Efic bcia da associagPo de mqtodos diagn£sticos no rastreamento do glaucoma. Arq. Bras. Oftalmol 2004; 67(1):37-41.
Foreign language

Costa, V. P, Schimiti, R. B, Avelino, R., and Kara-Jose, N Full threshold vs sita in normal individuals undergoing automated perimetry for the first time. American Academy of Ophthalmology 2001; : 148.
Does not address any key questions

Costa, V. P, Schimiti, R. B, Avelino, R., and Kara-Jose, N Full threshold vs sita in normal individuals undergoing automated perimetry for the first time. American Academy of Ophthalmology 2001; : 148.
It does not address the adequate population

Costa, V. P., Medeiros, F. A., Sample, P. A., and Weinreb, R. N Frequency doubling technology perimetry abnormalities as predictors of glaucomatous visual field loss [2] (multple letters). Am. J. Ophthalmol. 2004; 138 (5): 897-899.
No original data (e.g., systematic review, narrative review, editorial, letter)

Costagliola, C., Russo, V., Camera, A., and Scibelli, G The Takagi Automatic Tangent Screen ATS-85 analyzer for the detection of glaucomatous patients. Ann Ophthalmol 91; 23 (1): 18-20.
Does not examine candidate screening tests for glaucoma

Cubbidge, R. P., Hosking, S. L., Hilton, E. J., and Gibson, J. M Regression analysis of ranked segment parameters for optic nerve head classification: a pilot study. Ophthalmic Physiol Opt 2007; 27 (2): 194-200.
Non-commercially available analysis of data

Cucevic, V., Brooks, A. M., Strang, N. T., Klein, A. G., and Nugent, K. A Use of a confocal laser scanning ophthalmoscope to detect glaucomatous cupping of the optic disc. Aust N Z J Ophthalmol 97; 25 (3): 217-20.
Infrequently used device

Da Pozzo, S., Fuser, M., Vattovani, O., Di Stefano, G., and Ravalico, G GDx-VCC performance in discriminating normal from glaucomatous eyes with early visual field loss. Graefes Arch Clin Exp Ophthalmol 2006; 244 (6): 689-95.
Does not use clinical assessment as reference standard

Daboue, A., Meda, N. D., and Ahnoux-Zabsonre, A [Eye tension and open angle glaucoma in a Burkina Faso hospital]. J Fr Ophtalmol 2002; 25 (1): 39-41.
Foreign language

Dadaci, Z., Bozkurt, B., Irkec, M. T., Orhan, M., and Arslan, U Relationship between short wavelength perimetry and central corneal thickness values in ocular hypertensive subjects. Eur J Ophthalmol 2006; 16 (5): 667-73.
Data not abstractable

Damato, B. E., Ahmed, J., Allan, D., McClure, E., and Jay, J. L The detection of glaucomatous visual field defects by oculo-kinetic perimetry: which points are best for screening?. Eye (Lond) 89; 3 (Pt 6) : 727-31.
Does not address any key questions

Damms, T. and Dannheim, F Sensitivity and specificity of optic disc parameters in chronic glaucoma. Invest Ophthalmol Vis Sci 93; 34 (7): 2246-50.
Abstract only

de la Rosa, M. G., Gonzalez-Hernandez, M., Lozano-Lopez, V., Mendez, M. S., and de la Vega, R. R Optic disc tomography and perimetry in controls, glaucoma suspects, and early and established glaucomas. Optom Vis Sci 2007; 84 (1): 33-41.
Other (specify): data not comparable

de Natale, R., Glaab-Schrems, E., and Krieglstein, G. K The prognosis of glaucoma investigated with computerized perimetry. Doc Ophthalmol 84; 58 (4): 385-92.
Does not address any key questions

de Saint Sardos, A., Kamdeu Fansi, A., Chagnon, M., and Harasymowycz, P. J Intraocular pressure adjusted for central corneal thickness as a screening tool for open-angle glaucoma in an at-risk population. Can J Ophthalmol 2009; 44 (5): 571-5.
Data not abstractable

DeBry, P. W., Krishna, R., and Willoughby, T. L Comparison of Intraocular Pressure Measurement by Dynamic Contour Tonometry and Goldmann Applanation Tonometry. IOVS 2003; : ARVO E-abstract 2185.
Abstract only

Detry-Morel, M., Jamart, J., Detry, M. B., Ledoux, A., and Pourjavan, S [Clinical evaluation of the Pascal dynamic contour tonometer]. J Fr Ophtalmol 2007; 30 (3): 260-70.
Data not abstractable

Detry-Morel, M., Zeyen, T., Kestelyn, P., Collignon, J., and Goethals, M Screening for glaucoma in a general population with the non-mydriatic fundus camera and the frequency doubling perimeter. Eur J Ophthalmol 2004; 14 (5): 387-93.
Data not abstractable

Devarajan, N., Williams, G. S., Hopes, M., O'Sullivan, D., and Jones, D The Carmarthenshire Glaucoma Referral Refinement Scheme, a safe and efficient screening service. Eye (Lond) 2011; 25 (1): 43-9.
Data not abstractable

Dielemans, I., Vingerling, J. R., Wolfs, R. C., Hofman, A., Grobbee, D. E., and de Jong, P. T The prevalence of primary open-angle glaucoma in a population-based study in The Netherlands. The Rotterdam Study. Ophthalmology 94; 101 (11): 1851-5.

Does not address any key questions

Doshi, A., Kreidl, K. O., Lombardi, L., Sakamoto, D. K., and Singh, K Nonprogressive glaucomatous cupping and visual field abnormalities in young Chinese males. Ophthalmology 2007; 114 (3): 472-9.

Does not address any key questions

Doyle, C. K., Brito, C. J., Woodward, K. R., Johnson, C. A., and Wall, M A Comparison of Catch Trial Methods Used in Conventional Perimetry in Glaucoma Patients. IOVS 2007; 48 : ARVO E-Abstract 1627.

Abstract only

Drum, B., Armaly, M. F., and Huppert, W Scotopic sensitivity loss in glaucoma. Arch Ophthalmol 86; 104 (5): 712-7.

Does not address any key questions

Dubay, H. B., Cyrlin, M. N., Rosenshein, J. S., and Tressler, C. S Comparison of Tendency Oriented Perimetry (TOP) Fast Strategy for Program 32 and the Glaucoma Programs (GI, G2) on the Octopus Perimeter Vs. the Humphrey Visual Field Analyzer Program 24-2 in Glaucoma Suspects and Glaucoma Patients. IOVS 99; 40 : ARVO Abstract 4432.

Abstract only

Duggan, C., Sommer, A., Auer, C., and Burkhard, K Automated differential threshold perimetry for detecting glaucomatous visual field loss. Am J Ophthalmol 85; 100 (3): 420-3.

Uses single test to diagnose glaucoma

Durmus, M., Karadag, R., Erdurmus, M., Totan, Y., and Feyzi Hepsen, I Assessment of cup-to-disc ratio with slit-lamp funduscopy, Heidelberg Retina Tomography II, and stereoscopic photos. Eur J Ophthalmol 2009; 19 (1): 55-60.

Does not address any key questions

Dzhumova, M. F. and Birich, T. A [Study of changes in the central visual field in early computer-assisted diagnosis of primary open-angle glaucoma]. Vestn Oftalmol 94; 110 (3): 3-5.

Foreign language

Eddy, D. M., Sanders, L. E., and Eddy, J. F The value of screening for glaucoma with tonometry. Surv Ophthalmol 83; 28 (3): 194-205.

Does not address any key questions

Eddy, D. M., Sanders, L. E., and Eddy, J. F The value of screening for glaucoma with tonometry. Surv Ophthalmol 83; 28 (3): 194-205.

No original data (e.g., systematic review, narrative review, editorial, letter)

Eichenbaum, K. D., Mezej, M., and Eichenbaum, J. W Comparing dynamic contour tonometry to Goldmann and hand-held tonometry in normal, ocular hypertension, and glaucoma populations. Ann Ophthalmol (Skokie) 2007; 39 (1): 41-9.

Does not address any key questions

Eikelboom, R. H., Cooper, R. L., and Barry, C. J A study of variance in densitometry of retinal nerve fiber layer photographs in normals and glaucoma suspects. INVEST. OPHTHALMOL. VIS. SCI. 90; 31 (11): 2373-2383.

Infrequently used device

Ekstrom, C Prevalence of open-angle glaucoma in central Sweden. The Tierp Glaucoma Survey. Acta Ophthalmol Scand 96; 74 (2): 107-12.

Does not address any key questions

Ellish, N. J. and Higginbotham, E. J Differences between screening sites in a glaucoma screening program. Ophthalmic Epidemiol 2002; 9 (4): 225-37.

Does not address any key questions

Erdurmus, M. and Yagci, R Dynamic contour tonometer versus goldmann applanation tonometer. J Glaucoma 2006; 15 (5): 471.

Does not address any key questions

Essock, E. A., Gunvant, P., Zheng, Y., Garway-Heath, D. F., Kotecha, A., and Spratt, A Predicting visual field loss in ocular hypertensive patients using wavelet-fourier analysis of GDx scanning laser polarimetry. Optom Vis Sci 2007; 84 (5): 380-7.

Does not address any key questions

Essock, E. A., Gunvant, P., Zheng, Y., Parikh, R. S., Prabakaran, S., Babu, J. G., Kumar, A. U., Chandrashekar, G., and Thomas, R Comparison of Shape-Based Analysis of Retinal Nerve Fiber Layer Data Obtained From OCT and GDX-VCC. IOVS 2006; 47 : ARVO E-abstract 3638.

Abstract only

Essock, E. A., Zheng, Y., and Gunvant, P Analysis of GDx-VCC polarimetry data by Wavelet-Fourier analysis across glaucoma stages. Invest Ophthalmol Vis Sci 2005; 46 (8): 2838-47.

Non-commercially available analysis of data

Fabre, K., Michiels, I., and Zeyen, T The sensitivity and specificity of TOP, FDP and GDX in screening for early glaucoma. Bull Soc Belge Ophtalmol 2000; 275 : 17-23.

Data not abstractable

Fankhauser, F [Kinetic perimetry]. Ophthalmologica 69; 158 (5): 406-18.

Foreign language

Fasolo LR, Mello PAdA, Prata J•nior JA. Novos m qtodos propedWuticos em glaucoma. Rev. Bras. Oftalmol 2004;63(3):197-207.

Foreign language

Ferreras, A., Larrosa, J. M., Polo, V., Pajarin, A. B., Mayoral, F., and Honrubia, F. M Frequency-doubling technology: searching for the optimum diagnostic criteria for glaucoma. Acta Ophthalmol Scand 2007; 85 (1): 73-9.

Testing in-house scoring system only

Ferreras, A., Pablo, L. E., Larrosa, J. M., Polo, V., Pajarin, A. B., and Honrubia, F. M Discriminating between normal and glaucoma-damaged eyes with the Heidelberg Retina Tomograph 3. Ophthalmology 2008; 115 (5): 775-781.e2.

Non-commercially available analysis of data

Ferreras, A., Pablo, L. E., Pajarin, A. B., Larrosa, J. M., Polo, V., and Honrubia, F. M Logistic regression analysis for early glaucoma diagnosis using optical coherence tomography. Arch Ophthalmol 2008; 126 (4): 465-70.

Non-commercially available analysis of data

Fitoussi, Y., Corbe, C., Hamard, H., and Perdriel, G [A glaucoma follow-up of 1500 persons over 20 years]. J Fr Ophtalmol 88; 11 (2): 151-4.

Foreign language

FitzSimon, J. S., Hodge, D. O., and Brubaker, R. F Long-term outcome of patients who undergo tonometry as part of a general physical examination. Mayo Clin Proc 98; 73 (4): 309-13**.**

Does not address any key questions

Flad, M., Paetzold, J., Krapp, E., Denk, P. O., Vonthein, R., and Schiefer, U Follow-up of Visual Field Defects with Fundus-oriented Perimetry (FOP) - a Comparative Pilot Study in Glaucoma Patients with and without Topical Brimonidine Therapy. IOVS 2003; : ARVO E-abstract 5224.

Abstract only

Flammer, J., Eppler, E., and Niesel, P [Quantitative perimetry in the glaucoma patient without local visual field defects]. Graefes Arch Clin Exp Ophthalmol 82; 219 (2): 92-4.

Foreign language

Fogagnolo, P., Mazzolani, F., Rossetti, L., and Orzalesi, N Detecting glaucoma with frequency-doubling technology perimetry: a comparison between N-30 and C-20 screening programs. J Glaucoma 2005; 14 (6): 485-91**.**

Does not use clinical assessment as reference standard

Fontana L, Armas R, Poinoosawmy D, Hitchings RA. P qrdida unilateral del campo visual en pacientes con glaucoma de tensi£n normal: seguimiento longitudinal. Arch. Chil. Oftalmol 1998; 55(1):39-43.

Foreign language

Ford, B. A., Artes, P. H., McCormick, T. A., Nicolela, M. T., LeBlanc, R. P., and Chauhan, B. C Comparison of data analysis tools for detection of glaucoma with the Heidelberg Retina Tomograph. Ophthalmology 2003; 110 (6): 1145-50**.**

Data not abstractable

Fortune, B., Demirel, S., Zhang, X., Hood, D. C., Patterson, E., Jamil, A., Mansberger, S. L., Cioffi, G. A., and Johnson, C. A Comparing multifocal VEP and standard automated perimetry in high-risk ocular hypertension and early glaucoma. Invest Ophthalmol Vis Sci 2007; 48 (3): 1173-80**.**

Infrequently used device: multifocal visual evoked potentials

Fortune, B., Zhang, X., Hood, D. C., Demirel, S., Patterson, E., Jamil, A., Mansberger, S. L., Cioffi, G. A., and Johnson, C. A Effect of recording duration on the diagnostic performance of multifocal visual-evoked potentials in high-risk ocular hypertension and early glaucoma. J Glaucoma 2008; 17 (3): 175-82**.**

Does not address any key questions

Francis, B. A, Ying-Lai, M., Winarko, J., Nguyen, B., Varma, R., and Los Angeles Latino Eye Study Group. Screening for Glaucomatous Optic Nerve Damage: The Los Angeles Latino Eye Study. IOVS 2005; 46 : ARVO E-abstract 2499.

Abstract only

Freitas TG, Freitas FVdJ. Sensibilidade e especificidade do per Æmetro de dupla freqnWncia. Arq. Bras. Oftalmol 2003; 66(4):423-6.

Foreign language

Fristrom, B Colour contrast sensitivity in ocular hypertension. A five-year prospective study. Acta Ophthalmol Scand 2002; 80 (2): 155-62**.**

Does not address any key questions

Funaki, S., Shirakashi, M., Yaoeda, K., Abe, H., Kunimatsu, S., Suzuki, Y., Tomita, G., Araie, M., Yamada, N., Uchida, H., Yamamoto, T., and Kitazawa, Y Specificity and sensitivity of glaucoma detection in the Japanese population using scanning laser polarimetry. Br J Ophthalmol 2002; 86 (1): 70-4**.**

Infrequently used device

Gabriele, M. L., Wollstein, G., Bilonick, R. A., Burgansky-Eliash, Z., Ishikawa, H., Kagemann, L. E., and Schuman, J. S Comparison of parameters from Heidelberg Retina Tomographs 2 and 3. Ophthalmology 2008; 115 (4): 673-7**.**

Does not address any key questions

Galvao Filho, R. P., Vessani, R. M., and Susanna, R. Jr. Comparison of retinal nerve fibre layer thickness and visual field loss between different glaucoma groups. Br J Ophthalmol 2005; 89 (8): 1004-7**.**

Other: outdated device

Garas, A., Vargha, P., and Hollo, G Diagnostic accuracy of nerve fibre layer, macular thickness and optic disc measurements made with the RTVue-100 optical coherence tomograph to detect glaucoma. Eye (Lond) 2011; 25 (1): 57-65**.**

It does not address the adequate population

Garcia de Blas Gonzalez, F., Barajas Gutierrez, M. A., Beneyto Martin, P., Del Cura Gonzalez, M. I., Sanz Cuesta, T., Vello Cuadrado, R., and Salvador Armendariz, C [Usefulness of a glaucoma and ocular hypertension screening strategy in primary care]. Aten Primaria 2007; 39 (4): 181-4.

Foreign language

Garcia De Blas Gonzalez, F., Gutierrez, M. A. B., Martin, P. B., Gonzalez, M. I. D. C., Cuesta, T. S., Cuadrado, R. V., and Armendariz, C. S Usefulness of a glaucoma and ocular hypertension screening strategy in primary care: Utilidad de una estrategia de cribado de hipertension ocular y glaucoma en atencion primaria. Aten. Prim. 2007; 39 (4): 181-184.

Foreign language

GarcÆa Arcaya JM. Comparaci£n de hallazgos por campimetrÆa de Humphrey, perimetrÆa de Goldmann y excavaci£n del disco £ptico en pacientes sospechosos de glaucoma primario de bngulo abierto. Rev. Oftalmol. Venez 1992; 48(1):75-88.

Foreign language

Gardiner, S. K., Anderson, D. R., Fingeret, M., McSoley, J. J., and Johnson, C. A Evaluation of decision rules for frequency-doubling technology screening tests. Optom Vis Sci 2006; 83 (7): 432-7**.**

Testing in-house scoring system only

Garzozi, H., Chung, H., Lang, Y., Kageman, L., Harri, A., and Shields, M. B IOP and PRK: A comparison of three different tonometers. Evid.-Based Eye Care 2001; 2 (3): 152-153**.**

Does not address any key questions

Garzozi, H., Chung, H., Lang, Y., Kageman, L., Harri, A., and Shields, M. B IOP and PRK: A comparison of three different tonometers. Evid.-Based Eye Care 2001; 2 (3): 152-153**.**

It does not address the adequate population

Gege, X. and Lingling, W Application of Heidelberg retina tomography III in glaucoma with unilateral visual field defects. Chin. Ophthalmic Res. 2008; 26 (6): 466-469.

Foreign language

Georgopoulos, G. T., Halkiadakis, I., Patsea, E., Papakonstantinou, D., Alexiou, M., Vergados, I., Andreanos, D., Theodossiadis, G., and Moschos, M Study of patients with ocular hypertension with scanning laser polarimetry and short-wavelength automatic perimetry. Ophthalmologica 2006; 220 (6): 361-7.

Does not address any key questions

Giangiacomo, A., Vimolchalao, N., Fontana, H., Hoffman, D. C., and Caprioli, J Comparison of Frequency Doubling Perimetry (Humphrey Matrix) to Standard Achromatic Perimetry for Glaucoma Patients. IOVS 2006; 47 : ARVO E-abstract 3990.

Abstract only

Gil MartÆnez TM, Segovia RodrÆguez N, Vieira Navarro JC. Correlaci£n entre la perimetrÆa por tecnologÆa de doble frecuencia y funci£n de sensibilidad al contraste en glaucoma primario de bngulo abierto. Rev. Oftalmol. Venez 2005; 61(4):182-8.

Foreign language

Giovannini, A., Amato, G., and Mariotti, C The macular thickness and volume in glaucoma: an analysis in normal and glaucomatous eyes using OCT. Acta Ophthalmol Scand Suppl 2002; 236 : 34-6.

Does not address any key questions

Girkin, C. A., DeLeon-Ortega, J. E., Xie, A., McGwin, G., Arthur, S. N., and Monheit, B. E Comparison of the Moorfields classification using confocal scanning laser ophthalmoscopy and subjective optic disc classification in detecting glaucoma in blacks and whites. Ophthalmology 2006; 113 (12): 2144-9.

Does not use clinical assessment as reference standard

Girkin, C. A., McGwin, G. Jr, Long, C., DeLeon-Ortega, J., Graf, C. M., and Everett, A. W Subjective and objective optic nerve assessment in African Americans and whites. Invest Ophthalmol Vis Sci 2004; 45 (7): 2272-8.

Uses single test to diagnose glaucoma

Giuffre, I Frequency Doubling Technology vs Standard Automated Perimetry in Ocular Hypertensive Patients. Open Ophthalmol J 2009; 3 : 6-9.

Other (specify): not screening

Goldbaum, M. H., Sample, P. A., White, H., Cote, B., Raphaelian, P., Fechtner, R. D., and Weinreb, R. N Interpretation of automated perimetry for glaucoma by neural network. INVEST. OPHTHALMOL. VIS. SCI. 94; 35 (9): 3362-3373.

Non-commercially available analysis of data

Goni-Foncillas, F. J, Guarro-Miralles, M., Ondategui, J. C, Borras, R., Peris, E., Herrero, R., and Navarro, A SITA Standard vs Full-Threshold Perimetry: A Prospective Long-Term Comparison. American Academy of Ophthalmology 2003; : 224.

Abstract only

Gonzales de la Rosa, M., Morales, J., Dannheim, F., Papst, E., Papst, N., Seiler, T. J., Matsumoto, C., Lachkar, Y., Mermoud, A., and Prunte, C Multicenter evaluation of tendency-oriented perimetry (TOP) using the G1 grid. Eur J Ophthalmol 2003; 13 (1): 32-41.

Does not address any key questions

Gonzalez De La Rosa, M. and Pareja, A Influence of the 'fatigue effect' on the mean deviation measurement in perimetry. EUR. J. OPHTHALMOL. 97; 7 (1): 29-34.

Does not address any key questions

Gonzalez Viejo, I., Pablo, L. E., Pueyo, M., Sanchez, A., Bueno, J., Melcon, B., and Honrubia, F. M Assessment of retinal nerve fibre layer in early glaucoma diagnosis. ANN. OPHTHALMOL. GLAUCOMA 97; 29 (2): 122-127.

Does not address any key questions

Gonzalez-de-la-Rosa, M., Gonzalez-Hernandez, M., Aguilar-Estevez, J., Diaz-Aleman, T., and Armas-Plasencia, R [Diagnostic capability of PULSAR, FDT y HRT-II in glaucoma suspects]. Arch Soc Esp Oftalmol 2007; 82 (7): 413-22.

Foreign language

Gottlieb, L. K., Schwartz, B., and Pauker, S. G Glaucoma screening. A cost-effectiveness analysis. Surv Ophthalmol 83; 28 (3): 206-26.

Does not address any key questions

Greenfield, D. S., Knighton, R. W., Feuer, W. J., Schiffman, J. C., Zangwill, L., and Weinreb, R. N Correction for corneal polarization axis improves the discriminating power of scanning laser polarimetry. Am J Ophthalmol 2002; 134 (1): 27-33.

Non-commercially available analysis of data

Greve, M. and Chisholm, I. A Comparison of the oculokinetic perimetry glaucoma screener with two types of visual field analyser. Can J Ophthalmol 93; 28 (5): 201-6.

Does not address any key questions

Grewal, D. S., Sehi, M., and Greenfield, D. S Diffuse glaucomatous structural and functional damage in the hemifield without significant pattern loss. Arch Ophthalmol 2009; 127 (11): 1442-8.

Does not address any key questions

Grodum, K., Heijl, A., and Bengtsson, B A comparison of glaucoma patients identified through mass screening and in routine clinical practice. Acta Ophthalmol Scand 2002; 80 (6): 627-31.

Does not address any key questions

Grodum, K., Heijl, A., and Bengtsson, B Glaucoma and mortality. Graefes Arch Clin Exp Ophthalmol 2004; 242 (5): 397-401.

Does not address any key questions

Grolman, B., Myers, K. J., and Lalle, P How reliable is the Goldmann tonometer as a standard?. J Am Optom Assoc 90; 61 (11): 857-862.

Does not address any key questions

Guedes, R. A., Guedes, V. M., and Chaoubah, A Focusing on patients at high-risk for glaucoma in Brazil: a pilot study. J Fr Ophtalmol 2009; 32 (9): 640-5.

Foreign language

Guedes, V., Schuman, J. S., Hertzmark, E., Wollstein, G., Correnti, A., Mancini, R., Lederer, D., Voskanian, S., Velazquez, L., Pakter, H. M., Pedut-Kloizman, T., Fujimoto, J. G., and Mattox, C Optical coherence tomography measurement of macular and nerve fiber layer thickness in normal and glaucomatous human eyes. Ophthalmology 2003; 110 (1): 177-89.

Does not address any key questions

Guedes, Viviane, Schuman, Joel S, Pakter, Helena M, Guedes, Jaime, and Susanna Junior, Remo. OCT em glaucoma. Rev. bras. oftalmol 2001; 60 (2): 152-156.

Foreign language

Gulati, V., Agarwal, H. C., Sihota, R., and Saxena, R Correlation analysis of visual field thresholds and scanning laser ophthalmoscopic optic nerve head measurements in glaucoma. Ophthalmic Physiol. Opt. 2003; 23 (3): 233-242.
Does not address any key questions

Gulati, V., Sihota, R., Agarwal, H., Saxena, R., and Sharma, A COMPARATIVE EVALUATION OF ACHROMATIC PERIMETRY AND FREQUENCY DOUBLING TECHNOLOGY AND CORRELATION WITH SCANNING LASER POLARIMETRY. American Academy of Optometry 2001; : 128.
Abstract only

Gundersen, K. G., Heijl, A., and Bengtsson, B Sensitivity and specificity of structural optic disc parameters in chronic glaucoma. Acta Ophthalmol Scand 96; 74 (2): 120-5.
Does not examine candidate screening tests for glaucoma

Gunvant, P., Zheng, Y., Essock, E. A., Parikh, R. S., Prabakaran, S., Babu, J. G., Shekar, C. G., and Thomas, R Comparison of shape-based analysis of retinal nerve fiber layer data obtained From OCT and GDx-VCC. J Glaucoma 2009; 18 (6): 464-71.
Does not use clinical assessment as reference standard

Gunvant, P., Zheng, Y., Essock, E. A., Parikh, R. S., Prabakaran, S., Babu, J. G., Shekar, G. C., and Thomas, R Application of shape-based analysis methods to OCT retinal nerve fiber layer data in glaucoma. J Glaucoma 2007; 16 (6): 543-8.
Does not use clinical assessment as reference standard

Gyatsho, J., Kaushik, S., Gupta, A., Pandav, S. S., and Ram, J Retinal nerve fiber layer thickness in normal, ocular hypertensive, and glaucomatous Indian eyes: an optical coherence tomography study. J Glaucoma 2008; 17 (2): 122-7.
Does not address any key questions

Hager, A. and Wiegand, W [Methods of measuring intraocular pressure independently of central corneal thickness]. Ophthalmologe 2008; 105 (9): 840-4.
Does not address any key questions

Halkiadakis, I., Kipioti, A., Emfietzoglou, I., Grigoropoulos, V., Katsis, A., Alimisi, S., Vergados, I., Theodossiadis, P., and Theodossiadis, G. P Comparison of optical coherence tomography and scanning laser polarimetry in glaucoma, ocular hypertension, and suspected glaucoma. Ophthalmic Surg Lasers Imaging 2008; 39 (2): 125-32.
Does not address any key questions

Hancock, S., Wild, J. M., and Cunliffe, I. A THE BETWEEN-VISIT REPRODUCIBILITY OF WHITE-ON-WHITE AUTOMATED PERIMETRY, SHORT WAVELENGTH AUTOMATED PERIMETRY AND FREQUENCY DOUBLING PERIMETRY. IOVS 98; 39 : ARVO Abstract 112.
Abstract only

Harasymowycz, P. J., Papamatheakis, D. G., Fansi, A. K., Gresset, J., and Lesk, M. R Validity of screening for glaucomatous optic nerve damage using confocal scanning laser ophthalmoscopy (Heidelberg Retina Tomograph II) in high-risk populations: a pilot study. Ophthalmology 2005; 112 (12): 2164-71.
Other: not screening

Harizman, N., Oliveira, C., Chiang, A., Tello, C., Marmor, M., Ritch, R., and Liebmann, J. M The ISNT rule and differentiation of normal from glaucomatous eyes. Arch Ophthalmol 2006; 124 (11): 1579-83.
Data not abstractable

Harizman, N., Zelefsky, J. R., Ilitchev, E., Tello, C., Ritch, R., and Liebmann, J. M Detection of glaucoma using operator-dependent versus operator-independent classification in the Heidelberg retinal tomograph-III. Br J Ophthalmol 2006; 90 (11): 1390-2.
Does not address any key questions

Harper, R. and Reeves, B The sensitivity and specificity of direct ophthalmoscopic optic disc assessment in screening for glaucoma: A multivariate analysis. Graefe's Arch. Clin. Exp. Ophthalmol. 2000; 238 (12): 949-955.
Does not use clinical assessment as reference standard

Hart, W. M. Jr and Becker, B The onset and evolution of glaucomatous visual field defects. Ophthalmology 82; 89 (3): 268-79.
Does not address any key questions

Hatch, W. V., Flanagan, J. G., Etchells, E. E., Williams-Lyn, D. E., and Trope, G. E Laser scanning tomography of the optic nerve head in ocular hypertension and glaucoma. Br J Ophthalmol 97; 81 (10): 871-6.
Does not address any key questions

Hawker, M. J., Edmunds, M. R., Vernon, S. A., Hillman, J. G., and MacNab, H. K The relationship between central corneal thickness and the optic disc in an elderly population: the Bridlington Eye Assessment Project. Eye (Lond) 2009; 23 (1): 56-62.
Does not address any key questions

Hawker, M. J., Vernon, S. A., and Ainsworth, G Specificity of the Heidelberg Retina Tomograph's diagnostic algorithms in a normal elderly population: the Bridlington Eye Assessment Project. Ophthalmology 2006; 113 (5): 778-85.
Data not abstractable

Hawker, M. J., Vernon, S. A., Tattersall, C. L., and Dua, H. S Detecting glaucoma with RADAAR: the Bridlington Eye Assessment Project. Br J Ophthalmol 2006; 90 (6): 744-8.
Other: radaar

Hayakawa, S., Hamajima, N., Yamamoto, T., and Kitazawa, Y [Analysis of therapeutic prognosis of primary open-angle glaucoma by the proportional hazards model and the life-table method]. Nippon Ganka Gakkai Zasshi 94; 98 (4): 379-84.
Foreign language

Haymes, S. A, Artes, P. H, Hutchison, D. M, McCormick, T. A, Varma, D. K, Nicolela, M. T, LeBlanc, R. P, and Chauhan, B. C. Comparison of Frequency Doubling Technology and Standard Automated Perimetry for Detecting Glaucomatous Visual Field Progression. A Longitudinal Prospective Study. IOVS 2004; 45 : ARVO E-abstract 3472.
Abstract only

Heeg, G. P. and Jansonius, N. M Influence of test reliability on the screening performance of frequency-doubling perimetry. Am J Ophthalmol 2006; 141 (3): 585-7.
Data not abstractable

Heeg, G. P. and Jansonius, N. M The groningen longitudinal glaucoma study III. The predictive value of frequency-doubling perimetry and GDx nerve fibre analyser test results for the development of glaucomatous visual field loss. Eye (Lond) 2009; 23 (8): 1647-52**.**
Other (specify): GDX alone

Heeg, G. P., Blanksma, L. J., Hardus, P. L., and Jansonius, N. M The Groningen Longitudinal Glaucoma Study. I. Baseline sensitivity and specificity of the frequency doubling perimeter and the GDx nerve fibre analyser. Acta Ophthalmol Scand 2005; 83 (1): 46-52**.**
Other (specify): GDX

Heijl, A. and Drance, S. M. A clinical comparison of three computerized automatic perimeters in the detection of glaucoma defects. Archives of Ophthalmology 81; 99 (5): 832-6**.**
Does not address any key questions

Heijl, A. and Drance, S. M. A clinical comparison of three computerized automatic perimeters in the detection of glaucoma defects. Archives of Ophthalmology 81; 99 (5): 832-6**.**
Does not examine candidate screening tests for glaucoma

Heijl, A. and Lundqvist, L The frequency distribution of earliest glaucomatous visual field defects documented by automatic perimetry. Acta Ophthalmol (Copenh) 84; 62 (4): 658-64**.**
Does not address any key questions

Heijl, A Perimetric point density and detection of glaucomatous visual field loss. Acta Ophthalmol (Copenh) 93; 71 (4): 445-50**.**
Does not address any key questions

Heijl, A Perimetric point density and detection of glaucomatous visual field loss. Acta Ophthalmol (Copenh) 93; 71 (4): 445-50**.**
It does not address the adequate population

Henderson, P. A., Medeiros, F. A., Zangwill, L. M., and Weinreb, R. N Relationship between central corneal thickness and retinal nerve fiber layer thickness in ocular hypertensive patients. Ophthalmology 2005; 112 (2): 251-6**.**
Data not abstractable

Henson, D. B, Spencer, A. F, Harper, R., and Cadman, E. J. Community refinement of glaucoma referrals (
Brief Record). Eye 2003; 17 (1): 21-26**.**
Does not address any key questions

Herba, E., Pojda, S. M., Zatorska, B., Pojda-Wilczek, D., and Makowiecka-Obidzinska, K [Short wavelength perimetry--the significance in diagnosis of glaucoma in myopic patients]. Klin Oczna 2004; 106 (1-2 Suppl): 225-7.
Foreign language

Hitzl, W., Bunce, C., Reitsamer, H. A., Grabner, G., and Hornykewycz, K The projected increase in glaucoma due to the aging population in Austria from 2001 to 2031: results based on data of the Salzburg-Moorfields Collaborative Glaucoma Study. Eur J Ophthalmol 2007; 17 (1): 45-52**.**
Does not address any key questions

Hitzl, W., Hornykewycz, K., Grabner, C., and Reitsamer, H. A On the relationship between age and prevalence and/or incidence of primary open-angle glaucoma in the "Salzburg-Moorfields Collaborative Glaucoma Study": Uber den zusammenhang zwischen lebensalter und pravalenz sowie inzidenz des primaren offenwinkelglaukoms in der "Salzburg-Moorfields- Collaborative-Glaucoma"-Studie. Klin. Monatsbl. Augenheilkd. 2007; 224 (2): 115-119.
Duplicate

Hitzl, W., Hornykewycz, K., Grabner, G., and Reitsamer, H. A [On the relationship between age and prevalence and/or incidence of primary open-angle glaucoma in the "Salzburg-Moorfields Collaborative Glaucoma Study"]. Klin Monbl Augenheilkd 2007; 224 (2): 115-9.
Foreign language

Hitzl, W., Hornykewycz, K., Grabner, G., and Reitsamer, H. A [The 'cup-to-disc ratio': a comparison of TopSS, HRT II and subjective findings]. Klin Monbl Augenheilkd 2007; 224 (5): 391-5.
Foreign language

Hitzl, W., Ortner, C., Hornykewycz, K., Grabner, G., and Reitsamer, H. A Resource use and costs for a glaucoma screening program in Austria: an 8-year review: a cost-consequence analysis based on the Salzburg-Moorfields Collaborative Glaucoma Study. Eur J Ophthalmol 2006; 16 (1): 92-9**.**
Does not address any key questions

Hoffmann, E. M., Bowd, C., Klein, N., Stemberger, K., Grus, F. H., and Pfeiffer, N Glaucoma detection using the GDx nerve fiber analyzer and the retinal thickness analyzer (RTA). Eur J Ophthalmol 2006; 16 (2): 251-8**.**
Other (specify): GDX

Hoh, S. T., Greenfield, D. S., Mistlberger, A., Liebmann, J. M., Ishikawa, H., and Ritch, R Optical coherence tomography and scanning laser polarimetry in normal, ocular hypertensive, and glaucomatous eyes. Am J Ophthalmol 2000; 129 (2): 129-35**.**
Does not address any key questions

Hoh, S. T Preperimetry diagnosis of glaucoma. Asian J. Ophthalmol. 2005; 7 (2): 44**.**
Does not address any key questions

Hollo, G., Follmann, P., and Pap, G A clinical evaluation of XPERT NCT (Reichert) for glaucoma screening by optometrists. Int Ophthalmol 92; 16 (4-5): 291-3**.**
Does not address any key questions

Hong, S., Moon, J. W., Ha, S. J., Kim, C. Y., Seong, G. J., and Hong, Y. J Evaluation of a new scoring system for retinal nerve fiber layer photography using HRA1 in 964 eyes. Korean J Ophthalmol 2007; 21 (4): 216-21**.**
Data not abstractable

Hood, D. C., Harizman, N., Kanadani, F. N., Grippo, T. M., Baharestani, S., Greenstein, V. C., Liebmann, J. M., and Ritch, R Retinal nerve fibre thickness measured with optical coherence tomography accurately detects confirmed glaucomatous damage. Br J Ophthalmol 2007; 91 (7): 905-7**.**
Testing in-house scoring system only

Hood, D. C., Raza, A. S., Kay, K. Y., Sandler, S. F., Xin, D., Ritch, R., and Liebmann, J. M A comparison of retinal nerve fiber layer (RNFL) thickness obtained with frequency and time domain optical coherence tomography (OCT). Opt Express 2009; 17 (5): 3997-4003.
Does not address any key questions

Hood, D. C., Raza, A. S., Kay, K. Y., Sandler, S. F., Xin, D., Ritch, R., and Liebmann, J. M A comparison of retinal nerve fiber layer (RNFL) thickness obtained with frequency and time domain optical coherence tomography (OCT). Opt Express 2009; 17 (5): 3997-4003.
Other (specify):

Horn, F. K., Brenning, A., Junemann, A. G., and Lausen, B Glaucoma detection with frequency doubling perimetry and short-wavelength perimetry. J. Glaucoma 2007; 16 (4): 363-371.
Non-commercially available analysis of data

Horn, F. K., Jonas, J. B., Korth, M., Junemann, A., and Grundler, A The full-field flicker test in early diagnosis of chronic open-angle glaucoma. Am J Ophthalmol 97; 123 (3): 313-9.
Data not abstractable

Horn, F. K., Mardin, C. Y., Bendschneider, D., Junemann, A. G., Adler, W., and Tornow, R. P Frequency doubling technique perimetry and spectral domain optical coherence tomography in patients with early glaucoma. Eye (Lond) 2010; : .
Non-commercially available analysis of data

Horn, F. K., Mardin, C. Y., Laemmer, R., Baleanu, D., Juenemann, A. M., Kruse, F. E., and Tornow, R. P Correlation between local glaucomatous visual field defects and loss of nerve fiber layer thickness measured with polarimetry and spectral domain OCT. Invest. Ophthalmol. Vis. Sci. 2009; 50 (5): 1971-1977.
Does not address any key questions

Horn, F. K., Nguyen, N. X., Mardin, C. Y., and Junemann, A. G Combined use of frequency doubling perimetry and polarimetric measurements of retinal nerve fiber layer in glaucoma detection. Am J Ophthalmol 2003; 135 (2): 160-8.
Does not address any key questions

Horn, F. K., Velten, I. M., Junemann, A., and Korth, M The full-field flicker test in glaucomas: Influence of intraocular pressure and pattern of visual field losses. Graefe's Arch. Clin. Exp. Ophthalmol. 99; 237 (8): 621-628.
Does not address any key questions

Horn, F. K., Wakili, N., Junemann, A. M., and Korth, M Testing for glaucoma with frequency-doubling perimetry in normals, ocular hypertensives, and glaucoma patients. Graefes Arch Clin Exp Ophthalmol 2002; 240 (8): 658-65.
Data not abstractable

Horowitz, J., Fishelzon-Arev, T., Rath, E. Z., Segev, E., and Geyer, O Comparison of optic nerve head topography findings in eyes with non-arteritic anterior ischemic optic neuropathy and eyes with glaucoma. Graefes Arch Clin Exp Ophthalmol 2010; 248 (6): 845-51.
Does not address any key questions

Hotchkiss, M. L., Robin, A. L., Quigley, H. A., and Pollack, I. P A comparison of Peritest automated perimetry and Goldmann perimetry. Arch Ophthalmol 85; 103 (3): 397-403.
Infrequently used device: peritest

Hougaard, J. L, Bengtsson, B., Ostenfeld, C., and Heijl, A Comparison of Retinal Nerve Fiber Layer Thickness Measurements Using Different Stratus-OCT Scan Protocols in Patients With Early Glaucoma. IOVS 2005; 46 : ARVO E-abstract 4817.
Abstract only

Hovding, G. and Aasved, H Prognostic factors in the development of manifest open angle glaucoma. A long-term follow-up study of hypertensive and normotensive eyes. Acta Ophthalmol (Copenh) 86; 64 (6): 601-8.
Does not address any key questions

Hu, C. N [An epidemiologic study of glaucoma in Shunyi County, Beijing]. Zhonghua Yan Ke Za Zhi 89; 25 (2): 115-9.
Foreign language

Huang, A., Smith, S., and Quigley, H A COMPARISON OF THE DICON SCREENING FIELD WITH THE HUMPHREY THRESHOLD FIELD IN DETECTING GLAUCOMA. IOVS 96; 37 : ARVO Abstract 2324.
Abstract only

Huang, M. L. and Chen, H. Y Development and comparison of automated classifiers for glaucoma diagnosis using Stratus optical coherence tomography. Invest Ophthalmol Vis Sci 2005; 46 (11): 4121-9.
Non-commercially available analysis of data

Hufnagl, C., Hitzl, W., Hornykewycz, K., Grabner, G., and Reitsamer, H. A [Comparison of central corneal thickness in patients participating in a glaucoma screening programme and those who were examined in the glaucoma unit]. Klin Monbl Augenheilkd 2008; 225 (2): 151-4.
Does not address any key questions

Hyman, L., Wu, S.-Y., Connell, A. M. S., Schachat, A., Nemesure, B., Hennis, A., and Leske, M. Cristina. Prevalence and causes of visual impairment in the Barbados Eye Study. Ophthalmology 2001; 108 (10): 1751-1756.
Does not examine candidate screening tests for glaucoma

Ianchulev, T., Pham, P., Makarov, V., Francis, B., and Minckler, D Peristat: a computer-based perimetry self-test for cost-effective population screening of glaucoma. Curr Eye Res 2005; 30 (1): 1-6.
Does not address any key questions

Ieong, A., Murdoch, I., Cousens, S., Healey, P., and Theodossiades, J Sensitivity and specificity of two glaucoma case-finding strategies for optometrists. Ophthalmic Physiol Opt 2003; 23 (4): 341-6.
Testing in-house scoring system only

Ieong, A., Theodossiades, J., Healey, P., and Murcoch, I A comparison of glaucoma case detection methods. IOVS 2001; 42 : ARVO Abstract 828.
Abstract only

Iester, M., Altieri, M., Capris, P., Zingirian, M., and Traverso, C. E Comparison between relative dispersion analysis of high-pass resolution perimetry and standard threshold perimetry. Eye (Lond) 2000; 14 Pt 5 : 742-6.
Does not address any key questions

Iester, M., Altieri, M., Vittone, P., Calabria, G., Zingirian, M., and Traverso, C. E Detection of glaucomatous visual field defect by nonconventional perimetry. Am J Ophthalmol 2003; 135 (1): 35-9**.**

Does not address any key questions

Iester, M., Broadway, D. C., Mikelberg, F. S., and Drance, S. M A comparison of healthy, ocular hypertensive, and glaucomatous optic disc topographic parameters. J Glaucoma 97; 6 (6): 363-70**.**

Does not address any key questions

Iester, M., Courtright, P., and Mikelberg, F. S Retinal nerve fiber layer height in high-tension glaucoma and healthy eyes. J Glaucoma 98; 7 (1): 1-7**.**

Does not address any key questions

Iester, M., De Ferrari, R., and Zanini, M Topographic analysis to discriminate glaucomatous from normal optic nerve heads with a confocal scanning laser: new optic disk analysis without any observer input. Surv Ophthalmol 99; 44 Suppl 1 : S33-40**.**

Non-commercially available analysis of data

Iester, M., Jonas, J. B., Mardin, C. Y., and Budde, W. M Discriminant analysis models for early detection of glaucomatous optic disc changes. Br. J. Ophthalmol. 2000; 84 (5): 464-468**.**

Does not use clinical assessment as reference standard

Iester, M., Mariotti, V., Lanza, F., and Calabria, G The effect of contour line position on optic nerve head analysis by Heidelberg Retina Tomograph. Eur J Ophthalmol 2009; 19 (6): 942-8**.**

Does not address any key questions

Iester, M., Mennoud, A., and Schnyder, C Frequency doubling technology and Octopus visual field. Acta ophthalmologica Scandinavica. Supplement 2000; (232): 23-4**.**

Does not address any key questions

Iester, M., Mikelberg, F. S., and Drance, S. M The effect of optic disc size on diagnostic precision with the Heidelberg retina tomograph. Ophthalmology 97; 104 (3): 545-8**.**

Other (specify): outdated

Iester, M., Mikelberg, F. S., and Drance, S. M The effect of optic disc size on diagnostic precision with the Heidelberg retina tomograph. Ophthalmology 97; 104 (3): 545-8**.**

Other (specify): Outdated device

Iester, M., Mikelberg, F. S., Courtright, P., and Drance, S. M Correlation between the visual field indices and Heidelberg retina tomograph parameters. J Glaucoma 97; 6 (2): 78-82**.**

Does not address any key questions

Iester, M., Mikelberg, F. S., Swindale, N. V., and Drance, S. M ROC analysis of Heidelberg Retina Tomograph optic disc shape measures in glaucoma. Can J Ophthalmol 97; 32 (6): 382-8**.**

Infrequently used device: HRT1

Iester, M., Perdicchi, A., Capris, E., Siniscalco, A., Calabria, G., and Recupero, S. M Comparison between discriminant analysis models and "glaucoma probability score" for the detection of glaucomatous optic nerve head changes. J Glaucoma 2008; 17 (7): 535-40**.**

Does not use clinical assessment as reference standard

Iester, M., Swindale, N. V., and Mikelberg, F. S Sector-based analysis of optic nerve head shape parameters and visual field indices in healthy and glaucomatous eyes. J Glaucoma 97; 6 (6): 370-6**.**

Does not address any key questions

Iester, M., Traverso, C. E., Capris, P., Vittone, P., and Zingirian, M Different value scales between frequency-doubling technique and standard threshold perimetry. Acta Ophthalmol. Scand. Suppl. 2000; 78 (232): 26-27**.**

Does not address any key questions

Iester, M., Traverso, C. E., De Feo, F., Sanna, G., Altieri, M., Vittone, P., and Calabria, G Correlation between frequency doubling technology and heidelberg retina tomograph. J Glaucoma 2005; 14 (5): 368-74**.**

Data not abstractable

Iester, M., Zanini, M., Vittone, P., and Calabria, G Detection of glaucomatous optic nerve head by using Heidelberg topographic maps. Eye (Lond) 2007; 21 (5): 609-13**.**

Does not use clinical assessment as reference standard

Ikeji, F. C, White, E. T, Shewry, J. M, Schlottmann, P. G, and Garway-Heath, D. F. Comparison of the Test-Retest Variability of Neuroretinal Rim Area Measurements in Normal and Glaucoma Patients Using HRT II and OCT3. IOVS 2005; 46 : ARVO E-abstract 4820.

Abstract only

Ito, A., Kawabata, H., Fujimoto, N., and Adachi-Usami, E Effect of myopia on frequency-doubling perimetry. Investigative ophthalmology & visual science 2001; 42 (5): 1107-10**.**

Does not address any key questions

Ivers, R. Q., Optom, B., Macaskill, P., Cumming, R. G., and Mitchell, P Sensitivity and specificity of tests to detect eye disease in an older population. Ophthalmology 2001; 108 (5): 968-75**.**

Other: not all subjects received exam for glaucoma

Iwase, A., Kitazawa, Y., Ohno, Y., Ansari, I., and Chauhan, B COMPARISON OF THE THRESHOLD VALUE OF SITA WITH THAT OF CONVENTIONAL PERIMETRY BY HUMPHREY FIELD ANALYZER IN GLAUCOMA PATIENTS. IOVS 2000; 41 : ARVO Abstract 466.

Abstract only

Iwase, A., Suzuki, Y., Araie, M., Yamamoto, T., Abe, H., Shirato, S., Kuwayama, Y., Mishima, H. K., Shimizu, H., Tomita, G., Inoue, Y., and Kitazawa, Y The prevalence of primary open-angle glaucoma in Japanese: the Tajimi Study. Ophthalmology 2004; 111 (9): 1641-8**.**

Does not address any key questions

Iwase, A., Tomidokoro, A., Araie, M., Shirato, S., Shimizu, H., and Kitazawa, Y Performance of frequency-doubling technology perimetry in a population-based prevalence survey of glaucoma: the Tajimi study. Ophthalmology 2007; 114 (1): 27-32.
Does not use clinical assessment as reference standard

Jacob, A., Thomas, R., Koshi, S. P., Braganza, A., and Muliyil, J Prevalence of primary glaucoma in an urban south Indian population. Indian J Ophthalmol 98; 46 (2): 81-6.
Does not address any key questions

Jacob, A., Thomas, R., Koshi, S. P., Braganza, A., and Muliyil, J Prevalence of primary glaucoma in an urban south Indian population. Indian J Ophthalmol 98; 46 (2): 81-6.
Other (specify): Prevelance study

James, A. C., Kolic, M., Bedford, S. M., and Maddess, T Stimulus Parameters for Multifocal Pupillographic Objective Perimetry. J Glaucoma 2011; : .
Does not address any key questions

Januleviciene, I., Sliesoraityte, I., Siesky, B., and Harris, A Diagnostic compatibility of structural and haemodynamic parameters in open-angle glaucoma patients. Acta Ophthalmol 2008; 86 (5): 552-7.
Does not address any key questions

Jarade, E. F., Abi Nader, F. C., and Tabbara, K. F Intraocular pressure measurement after hyperopic and myopic LASIK. J Refract Surg 2005; 21 (4): 408-10.
Does not address any key questions

Jenchitr, W., Pongprayoon, C., Sothornwit, N., Choosri, P., Yenjitr, C., and Tapunya, M Eye health of priests and novices in rural area J Med Assoc Thai 2008; 91 Suppl 1 : S73-80.
Does not address any key questions

Jenchitr, W., Pongprayoon, C., Sothornwit, N., Choosri, P., Yenjitr, C., and Tapunya, M Eye health of priests and novices in rural area J Med Assoc Thai 2008; 91 Suppl 1 : S73-80.
Other (specify): More of a prevalence study and complete exam

Jensen, J. E Glaucoma screening a 16-year follow-up of ocular normotensives. Acta Ophthalmol (Copenh) 84; 62 (2): 203-9.
Does not address any key questions

Jeoung, J. W., Park, K. H., Kim, T. W., Khwarg, S. I., and Kim, D. M Diagnostic ability of optical coherence tomography with a normative database to detect localized retinal nerve fiber layer defects. Ophthalmology 2005; 112 (12): 2157-63.
Does not address any key questions

Joffe, K. M., Raymond, J. E., and Chrichton, A Motion coherence perimetry in glaucoma and suspected glaucoma. Vision Res 97; 37 (7): 955-64.
Does not address any key questions

Johannesson, G., Hallberg, P., Eklund, A., and Linden, C Pascal, ICare and Goldmann applanation tonometry--a comparative study. Acta Ophthalmol 2008; 86 (6): 614-21.
Does not address any key questions

Johnson, C. A., Adams, A. J., Casson, E. J., and Brandt, J. D Blue-on-yellow perimetry can predict the development of glaucomatous visual field loss. Arch Ophthalmol 93; 111 (5): 645-50.
Does not address any key questions

Johnson, C. A., Adams, A. J., Casson, E. J., and Brandt, J. D Progression of early glaucomatous visual field loss as detected by blue-on-yellow and standard white-on-white automated perimetry. Arch Ophthalmol 93; 111 (5): 651-6.
Does not address any key questions

Johnson, C. A., Cioffi, G. A., and Van Buskirk, E. M Frequency doubling technology perimetry using a 24--2 stimulus presentation pattern. Optom Vis Sci 99; 76 (8): 571-81.
Does not address any key questions

Johnson, C. A., Cioffi, G. A., Drance, S. M., Gaasterland, D., Mills, R. P., Ashburn, F., Hnik, P., and Van Coevorden, R. E A multicenter comparison study of the Humphrey Field Analyzer I and the Humphrey Field Analyzer II. Ophthalmology 97; 104 (11): 1910-7.
Does not address any key questions

Johnson, C. A., Sample, P. A., Cioffi, G. A., Liebmann, J. R., and Weinreb, R. N Structure and function evaluation (SAFE): I. criteria for glaucomatous visual field loss using standard automated perimetry (SAP) and short wavelength automated perimetry (SWAP). Am J Ophthalmol 2002; 134 (2): 177-85.
Data not abstractable

Johnson, C. A., Sample, P. A., Zangwill, L. M., Vasile, C. G., Cioffi, G. A., Liebmann, J. R., and Weinreb, R. N Structure and function evaluation (SAFE): II. Comparison of optic disk and visual field characteristics. Am J Ophthalmol 2003; 135 (2): 148-54.
Does not address any key questions

Johnson, C. A A COMPARISON OF SWAP AND FDT PERIMETRY IN EARLY GLAUCOMAS AND HIGH RISK OCULAR HYPERTENSIVES. American Academy of Optometry 98; : 32.
Abstract only

Jonas, J. B. and Konigsreuther, K. A Optic disk appearance in ocular hypertensive eyes. Am J Ophthalmol 94; 117 (6): 732-40.
Does not address any key questions

Jonas, J. B., Mardin, C. Y., and Grundler, A. E Comparison of measurements of neuroretinal rim area between confocal laser scanning tomography and planimetry of photographs. Br. J. Ophthalmol. 98; 82 (4): 362-366.
Does not address any key questions

Jonas, J. B., Stroux, A., Velten, I., Juenemann, A., Martus, P., and Budde, W. M Central corneal thickness correlated with glaucoma damage and rate of progression. Invest Ophthalmol Vis Sci 2005; 46 (4): 1269-74.
Does not address any key questions

Jordo, M. L. S., Pedroso De Carvalho Lupinacci, A., Ferreira, E. L., Enomoto, I. J. F., and Costa, V. P Influence of age, central corneal thickness, and quality score on dynamic contour tonometry. Eye 2009; 23 (6): 1364-1369.
Does not address any key questions

Kalaboukhova, L., Fridhammar, V., and Lindblom, B Glaucoma follow-up by the Heidelberg retina tomograph--new graphical analysis of optic disc topography changes. Graefes Arch Clin Exp Ophthalmol 2006; 244 (6): 654-62.

Does not address any key questions

Kamal, D. S., Bunce, C., and Hitchings, R. A Use of the GDx to detect differences in retinal nerve fibre layer thickness between normal, ocular hypertensive and early glaucomatous eyes. Eye (Lond) 2000; 14 (Pt 3A) : 367-70.

Does not address any key questions

Kamal, D. S., Garway-Heath, D. F., Hitchings, R. A., and Fitzke, F. W Use of sequential Heidelberg retina tomograph images to identify changes at the optic disc in ocular hypertensive patients at risk of developing glaucoma. Br J Ophthalmol 2000; 84 (9): 993-8.

Does not address any key questions

Kamantigue, M. E. G., Joson, P. J., and Chen, P. P Prediction of visual field defects on standard automated perimetry by screening C-20-1 frequency doubling technology perimetry. J. Glaucoma 2006; 15 (1): 35-39.

Does not address any key questions

Kampmeier, J. M., Eisert, B., Lang, G. K., and Lang, G. E COMPARISON OF FREQUENCY DOUBLING PERIMETRY VS STANDARD AUTOMATED PERIMETRY IN GLAUCOMA AND AGE-RELATED MACULOPATHY. IOVS 2000; 41 : ARVO Abstract 459.

Abstract only

Kamppeter, B. A. and Jonas, J. B Dynamic contour tonometry for intraocular pressure measurement. Am J Ophthalmol 2005; 140 (2): 318-20.

Does not address any key questions

Kanamori, A., Nakamura, M., Escano, M. F., Seya, R., Maeda, H., and Negi, A Evaluation of the glaucomatous damage on retinal nerve fiber layer thickness measured by optical coherence tomography. Am J Ophthalmol 2003; 135 (4): 513-20.

Infrequently used device: OCT2000

Karickhoff, J. R Adding automated perimetry to glaucoma evaluation and treatment. Ann Ophthalmol 91; 23 (12): 470-3.

Does not address any key questions

Katsanos, A., Kothy, P., Konstas, A. G., Vargha, P., and Hollo, G Correlation between polarimetric retinal nerve fiber layer thickness and retinal sensitivity determined with frequency-doubling technology. Ophthalmic Surg Lasers Imaging 2005; 36 (5): 394-400.

Data not abstractable

Katz, L. J., Henderer, J. D., Ten Hulzen, R. D., and Spaeth, G. L A COMPARISON OF THE 1% AND 5% SCREENING PROTOCOLS OF THE FREQUENCY DOUBLING PERIMETER WITH THE HUMPHREY SITA FAST AND SITA STANDARD ALGORITHMS IN A GLAUCOMA CLINIC POPULATION. IOVS 2000; 41 : ARVO Abstract 462.

Abstract only

Kaushik, S., Gyatsho, J., Jain, R., Pandav, S. S., and Gupta, A Correlation between retinal nerve fiber layer thickness and central corneal thickness in patients with ocular hypertension: an optical coherence tomography study. Am J Ophthalmol 2006; 141 (5): 884-890.

Data not abstractable

Kee, C. and Cho, C Evaluation of retinal nerve fiber layer thickness in the area of apparently normal hemifield in glaucomatous eyes with optical coherence tomography. J Glaucoma 2003; 12 (3): 250-4.

Does not address any key questions

Kesen, M. R., Spaeth, G. L., Henderer, J. D., Pereira, M. L., Smith, A. F., and Steinmann, W. C The Heidelberg Retina Tomograph vs clinical impression in the diagnosis of glaucoma. Am J Ophthalmol 2002; 133 (5): 613-6.

Unspecified diagnosis of Glaucoma

Khandekar, R. and Al Raisi, A Oman Eye Study 2005: validity of screening tests used in the glaucoma survey. East Mediterr Health J 2008; 14 (6): 1360-4.

Other (specify): Only abnormal subjects received clinical exam

Khandekar, R. and Zutshi, R Glaucoma among Omani diabetic patients: a cross-sectional descriptive study: (Oman diabetic eye study 2002). Eur J Ophthalmol 2004; 14 (1): 19-25.

Does not address any key questions

Khandekar, R., Zutshi, R., Ali, M., Raisi, A. A., and Dass, H Influence of diabetes on the validity glaucoma screening by frequency doubling perimetry: a hospital-based study in Oman. Diabetes Technol Ther 2008; 10 (4): 278-82.

Other: Not acceptable definition of glaucoma

Kim, C. S., Seong, G. J., Lee, N. H., and Song, K. C Prevalence of primary open-angle glaucoma in central South Korea the Namil study. Ophthalmology 2011; 118 (6): 1024-30.

Other (specify): prevalence of POAG in screened population only

Kim, T. W., Park, U. C., Park, K. H., and Kim, D. M Ability of Stratus OCT to identify localized retinal nerve fiber layer defects in patients with normal standard automated perimetry results. Invest Ophthalmol Vis Sci 2007; 48 (4): 1635-41.

Data not abstractable

Kim, T. W., Zangwill, L. M., Bowd, C., Sample, P. A., Shah, N., and Weinreb, R. N Retinal nerve fiber layer damage as assessed by optical coherence tomography in eyes with a visual field defect detected by frequency doubling technology perimetry but not by standard automated perimetry. Ophthalmology 2007; 114 (6): 1053-7.

Data not abstractable

King, A. J., Bolton, N., Aspinall, P., and O'Brien, C. J Measurement of peripapillary retinal nerve fiber layer volume in glaucoma. Am J Ophthalmol 2000; 129 (5): 599-607.

Data not abstractable

King, A. J., Bolton, N., Aspinall, P., and O'Brien, C. J Measurement of peripapillary retinal nerve fiber layer volume in glaucoma. Am J Ophthalmol 2000; 129 (5): 599-607.

Does not address any key questions

Kishida, A [Mass examination for glaucoma. A 12 year follow up (author's transl)]. Nippon Ganka Gakkai Zasshi 73; 77 (10): 1578-92.

Foreign language

KITAZAWA Yoshiaki, SHIRATO Shiroaki, HORIE Takeshi, GO Fujin, and YUMITA Akira. The Effects of 5-Oxin on Intraocular Pressure and Visual Field Defects in Primary Open-Angle Glaucoma: Double Masked Study. Therapeutic Research (Therapeutic Research) 84; 1 (3): 501-510**.**

Does not address any key questions

Klemm, M., Rumberger, E., Walter, A., and Richard, G [Quantification of retinal nerve fiber thickness. A comparison of laser scanning ophthalmoscopy, polarimetry and optical coherence tomography in healthy and glaucomatous eyes]. Ophthalmologe 2001; 98 (9): 832-43.

Foreign language

Klemm, M., Rumberger, E., Walter, A., and Richard, G [Reproducibility of measuring retinal nerve fiber density. Comparison of optical coherence tomography with the nerve fiber analyzer and the Heidelberg retinal tomography device]. Der Ophthalmologe : Zeitschrift der Deutschen Ophthalmologischen Gesellschaft 2002; 99 (5): 345-51.

Foreign language

Klemm, M., Rumberger, E., Winter, R., Walter, A., and Richard, G Reliability and precision of retinal nerve fiber layer thickness measurements: Comparison of OCT to NFA. Spektrum der Augenheilkunde 2000; 14 (6): 301-305.

Foreign language

Kniestedt, C., Lin, S., Choe, J., Nee, M., Bostrom, A., Sturmer, J., and Stamper, R. L Correlation between intraocular pressure, central corneal thickness, stage of glaucoma, and demographic patient data: prospective analysis of biophysical parameters in tertiary glaucoma practice populations. J Glaucoma 2006; 15 (2): 91-7**.**

Does not address any key questions

Knox, P. C., Cunningham, I., and Fisher, A. C The Impact of Secondary Auditory Tasks on SITA Standard Perimetry in Glaucoma Patients and Healthy Controls. IOVS 2006; 47 : ARVO E-abstract 1122.

Abstract only

Ko, Y.-C., Liu, C. J. I., and Hsu, W.-M Varying effects of corneal thickness on intraocular pressure measurements with different tonometers. Eye 2005; 19 (3): 327-332**.**

Does not address any key questions

Kogure, S., Toda, Y., and Tsukahara, S Prediction of future scotoma on conventional automated static perimetry using frequency doubling technology perimetry. Br J Ophthalmol 2006; 90 (3): 347-52**.**

Does not address any key questions

Kohler, U. and Schmoger, E [Follow-up of cases of suspected glaucoma (author's transl)]. Klin Monbl Augenheilkd 75; 166 (1): 11-7.

Foreign language

Kook, M. S., Cho, H. S., Seong, M., and Choi, J Scanning laser polarimetry using variable corneal compensation in the detection of glaucoma with localized visual field defects. Ophthalmology 2005; 112 (11): 1970-8**.**

Non-commercially available analysis of data

Korth, M. J., Junemann, A. M., Horn, F. K., Bergua, A., Cursiefen, C., Velten, I., Budde, W. M., Wisse, M., and Martus, P [Synopsis of various electrophysiological tests in early glaucoma diagnosis--temporal and spatiotemporal contrast sensitivity, light- and color-contrast pattern-reversal electroretinogram, blue-yellow VEP]. Klin Monbl Augenheilkd 2000; 216 (6): 360-8.

Foreign language

Korzekwa, W., Korzekwa, M., Markowska, J., Wojcik-Niklewska, B., Romaniuk, W., Korzekwa, A., and Michalska-Malecka, K [Frequency doubling perimetry in diagnosis of early glaucomatous optic nerve fiber damage]. Klin Oczna 2004; 106 (1-2 Suppl): 222-4.

Foreign language

Kosoko, O., Sommer, A., and Auer, C Screening with automated perimetry using a threshold-related three-level algorithm. Ophthalmology 86; 93 (7): 882-6**.**

Non-commercially available analysis of data

Kozlova, L. P. and Fedorova, S. M [Results of prolonged dispensarization of persons with suspected glaucoma]. Oftalmol Zh 74; 29 (4): 285-8.

Foreign language

Kruger, H., Schittkowski, M. P., and Guthoff, R. F [Comparing applanation and impression tonometry in Central African Bantu people]. Klin Monbl Augenheilkd 2007; 224 (9): 722-6**.**

Does not address any key questions

Kuroedov, A. V., Zhukov, V. F., Sol'nov, N. M., Kushim, Z. P., and Makarova, A. I. u [Efficiency of mass screening system and routine medical check-up of glaucoma patients.]. Voen Med Zh 2004; 325 (4): 38-41.

Foreign language

Kuroedov, A. V., Zhukov, V. F., Sol'nov, N. M., Kushim, Z. P., and Makarova, A. I Efficiency of mass screening system and routine medical check-up of glaucoma patients.: Effektivnost' sistemy skriningovogo obsledovaniia i dispansernogo nabliudeniia bol'nykh glaukomoi Voen Med Zh 2004; 325 (4): 38-41.

Foreign language

Kwartz, A. J., Henson, D. B., Harper, R. A., Spencer, A. F., and McLeod, D The effectiveness of the Heidelberg Retina Tomograph and laser diagnostic glaucoma scanning system (GDx) in detecting and monitoring glaucoma. Health Technol Assess 2005; 9 (46): 1-132, iii**.**

Does not use clinical assessment as reference standard

Lachkar, Y. and Cohn, H Sensitivity and specificity of optic disc variables and analysis of a new variable (MP/D) for glaucoma diagnosis with the Glaucoma-Scope. Br J Ophthalmol 97; 81 (10): 846-51**.**

Infrequently used device: experimental

Lalezary, M., Medeiros, F. A., Weinreb, R. N., Bowd, C., Sample, P. A., Tavares, I. M., Tafreshi, A., and Zangwill, L. M Baseline optical coherence tomography predicts the development of glaucomatous change in glaucoma suspects. Am J Ophthalmol 2006; 142 (4): 576-82**.**

Other (specify): Excluded device

Lam, A., Chen, D., Chiu, R., and Chui, W. S Comparison of IOP measurements between ORA and GAT in normal Chinese. Optom Vis Sci 2007; 84 (9): 909-14.
Does not address any key questions

Lam, D. S., Leung, D. Y., Chiu, T. Y., Fan, D. S., Cheung, E. Y., Wong, T. Y., Lai, J. S., and Tham, C. C Pressure phosphene self-tonometry: a comparison with goldmann tonometry in glaucoma patients. Invest Ophthalmol Vis Sci 2004; 45 (9): 3131-6.
Does not address any key questions

Landers, J. A., Goldberg, I., and Graham, S. L Detection of Early Visual Field Loss in Glaucoma Using Frequency-Doubling Perimetry and Short-Wavelength Automated Perimetry. Arch. Ophthalmol. 2003; 121 (12): 1705-1710.
Does not address any key questions

Landers, J., Goldberg, I., and Graham, S A comparison of short wavelength automated perimetry with frequency doubling perimetry for the early detection of visual field loss in ocular hypertension. Clin. Exp. Ophthalmol. 2000; 28 (4): 248-252.
Does not address any key questions

Langerhorst, C. T., van den Berg, T. J., and Greve, E. L Is there general reduction of sensitivity in glaucoma?. Int Ophthalmol 89; 13 (1-2): 31-5.
Does not address any key questions

Larrosa, J. M., Polo, V., Perez-Inigo, A., Ferreras, A., Garcia-Feijoo, J., Anton, A., and Honrubia, F. M [Optic nerve head parameters as measured by confocal scanning laser (Heidelberg Retina Tomograph II) in normal, ocular hypertensive and glaucomatous subjects]. Arch Soc Esp Oftalmol 2008; 83 (7): 407-15.
Data not abstractable

Lauande-Pimentel R, Barton K, Poinoosawmy D, Maino A, Heath TG, Hitchings R. Detec gPo de alteragões na camada de fibras nervosas da retina por meio do laser confocal polarizado em hipertens Po ocular antes do surgimento de defeitos perimqtricos. Arq. Bras. Oftalmol 2004; 67(5):703-7.
Foreign language

Lauande-Pimentel, R., Carvalho, R. A., Oliveira, H. C., Goncalves, D. C., Silva, L. M., and Costa, V. P Discrimination between normal and glaucomatous eyes with visual field and scanning laser polarimetry measurements. Br J Ophthalmol 2001; 85 (5): 586-91.
Infrequently used device: outdated devices

Lederer, D. E., Schuman, J. S., Hertzmark, E., Heltzer, J., Velazques, L. J., Fujimoto, J. G., and Mattox, C Analysis of macular volume in normal and glaucomatous eyes using optical coherence tomography. Am J Ophthalmol 2003; 135 (6): 838-43.
Does not address any key questions

Lee, P. P., Walt, J. W., Rosenblatt, L. C., Siegartel, L. R., and Stern, L. S Association between intraocular pressure variation and glaucoma progression: data from a United States chart review. Am J Ophthalmol 2007; 144 (6): 901-907.
Does not address any key questions

Lee, S. Y., Ha, D. W., and Kook, M. S Ability of scanning laser polarimetry (GDx) to discriminate among early glaucomatous, ocular hypertensive and normal eyes in the Korean population. Korean J Ophthalmol 2004; 18 (1): 1-8.
Other (specify): outdated device

Lee, S. Y., Ha, D. W., and Kook, M. S Ability of scanning laser polarimetry (GDx) to discriminate among early glaucomatous, ocular hypertensive and normal eyes in the Korean population. Korean J Ophthalmol 2004; 18 (1): 1-8.
Other (specify): outdated device per specialist

Leighton, D. A. and Phillips, C. I Provocative test combining water drinking and homatropine eye drops. Applanation versus tonography. The British journal of ophthalmology 71; 55 (9): 619-27.
Does not address any key questions

Leske, M. C., Connell, A. M. S., Schachat, A. P., and Hyman, L The Barbados Eye Study: Prevalence of open angle glaucoma. ARCH. OPHTHALMOL. 94; 112 (6): 821-829.
Does not address any key questions

Leske, M. C., Connell, A. M. S., Wu, S.-Y., Hyman, L. G., and Schachat, A. P Risk factors for open-angle glaucoma: The Barbados eye study. ARCH. OPHTHALMOL. 95; 113 (7): 918-924.
Does not address any key questions

Leske, M. C., Connell, A. M. S., Wu, S.-Y., Hyman, L. G., and Schachat, A. P Risk factors for open-angle glaucoma: The Barbados eye study. ARCH. OPHTHALMOL. 95; 113 (7): 918-924.
It does not address the adequate population

Leske, M. C., Connell, A. M. S., Wu, S.-Y., Nemesure, B., Li, X., Schachat, A., and Hennis, A Incidence of open-angle glaucoma: The Barbados Eye Studies. Arch. Ophthalmol. 2001; 119 (1): 89-95.
Does not address any key questions

Leske, M. C., Connell, A. M., Wu, S. Y., Nemesure, B., Li, X., Schachat, A., and Hennis, A Incidence of open-angle glaucoma: the Barbados Eye Studies. The Barbados Eye Studies Group. Arch Ophthalmol 2001; 119 (1): 89-95.
Does not address any key questions

Leske, M. C., Nemesure, B., He, Q., Wu, S. Y., Fielding Hejtmancik, J., and Hennis, A Patterns of open-angle glaucoma in the Barbados Family Study. Ophthalmology 2001; 108 (6): 1015-22.
Does not address any key questions

Leske, M. C., Warheit-Roberts, L., and Wu, S. Y Open-angle glaucoma and ocular hypertension: the Long Island Glaucoma Case-control Study. Ophthalmic Epidemiol 96; 3 (2): 85-96.
Does not address any key questions

Leske, M. C., Wu, S. Y., Hennis, A., Honkanen, R., and Nemesure, B Risk factors for incident open-angle glaucoma: the Barbados Eye Studies. Ophthalmology 2008; 115 (1): 85-93.
Does not address any key questions

Leske, M. C., Wu, S. Y., Honkanen, R., Nemesure, B., Schachat, A., Hyman, L., and Hennis, A Nine-year incidence of open-angle glaucoma in the Barbados Eye Studies. Ophthalmology 2007; 114 (6): 1058-64.
Does not address any key questions

Leske, M. C., Wu, S. Y., Nemesure, B., and Hennis, A Incident open-angle glaucoma and blood pressure. Arch Ophthalmol 2002; 120 (7): 954-9.
Does not address any key questions

Leung, C. K., Chan, W. M., Chong, K. K., Yung, W. H., Tang, K. T., Woo, J., Chan, W. M., and Tse, K. K Comparative study of retinal nerve fiber layer measurement by StratusOCT and GDx VCC, I: correlation analysis in glaucoma. Invest Ophthalmol Vis Sci 2005; 46 (9): 3214-20**.**

Data not abstractable

Leung, C. K., Chan, W. M., Hui, Y. L., Yung, W. H., Woo, J., Tsang, M. K., and Tse, K. K Analysis of retinal nerve fiber layer and optic nerve head in glaucoma with different reference plane offsets, using optical coherence tomography. Invest Ophthalmol Vis Sci 2005; 46 (3): 891-9**.**

Non-commercially available analysis of data

Leung, C. K., Cheung, C. Y., Weinreb, R. N., Qiu, Q., Liu, S., Li, H., Xu, G., Fan, N., Huang, L., Pang, C. P., and Lam, D. S Retinal nerve fiber layer imaging with spectral-domain optical coherence tomography: a variability and diagnostic performance study. Ophthalmology 2009; 116 (7): 1257-63, 1263.e1-2**.**

Does not use clinical assessment as reference standard

Leung, C. K., Choi, N., Weinreb, R. N., Liu, S., Ye, C., Liu, L., Lai, G. W., Lau, J., and Lam, D. S Retinal nerve fiber layer imaging with spectral-domain optical coherence tomography: pattern of RNFL defects in glaucoma. Ophthalmology 2010; 117 (12): 2337-44**.**

Non-commercially available analysis of data

Leung, C. K., Lam, S., Weinreb, R. N., Liu, S., Ye, C., Liu, L., He, J., Lai, G. W., Li, T., and Lam, D. S Retinal nerve fiber layer imaging with spectral-domain optical coherence tomography: analysis of the retinal nerve fiber layer map for glaucoma detection. Ophthalmology 2010; 117 (9): 1684-91**.**

Other (specify): scoring system unavailable

Leung, C. K., Ye, C., Weinreb, R. N., Cheung, C. Y., Qiu, Q., Liu, S., Xu, G., and Lam, D. S Retinal nerve fiber layer imaging with spectral-domain optical coherence tomography a study on diagnostic agreement with Heidelberg Retinal Tomograph. Ophthalmology 2010; 117 (2): 267-74**.**

Does not use clinical assessment as reference standard

Leydhecker, W [The reliability of diagnosis of simple glaucoma in the early stage]. Doc Ophthalmol 66; 20 : 214-29.

Foreign language

Li, J. J., Xu, L., Zhang, R. X., Sun, X. Y., Yang, H., Zou, Y., and Zhao, J. L [The value of frequency doubling perimetry in glaucoma screening of aged 40 or more population]. Zhonghua Yan Ke Za Zhi 2005; 41 (3): 221-5.

Foreign language

Li, S., Wang, X., Li, S., Wu, G., and Wang, N Evaluation of optic nerve head and retinal nerve fiber layer in early and advance glaucoma using frequency-domain optical coherence tomography. Graefes Arch Clin Exp Ophthalmol 2010; 248 (3): 429-34**.**

Does not use clinical assessment as reference standard

Li, Y., Shi, J., Duan, X., and Fan, F Transpalpebral measurement of intraocular pressure using the Diaton tonometer versus standard Goldmann applanation tonometry. Graefe's Arch. Clin. Exp. Ophthalmol. 2010; 248 (12): 1765-1770**.**

Does not examine candidate screening tests for glaucoma

Libera, R. D., Moriyama, A. S., and Melo, L. A. S. Jr. Comparison Between Swedish Interactive Threshold Algorithm and Full Threshold Strategies in Short Wavelength Automated Perimetry. IOVS 2008; : ARVO E- abstract 1074.

Abstract only

Lin, H. Y., Hsu, W. M., Chou, P., Liu, C. J., Chou, J. C., Tsai, S. Y., and Cheng, C. Y Intraocular pressure measured with a noncontact tonometer in an elderly Chinese population: the Shihpai Eye Study. Arch Ophthalmol 2005; 123 (3): 381-6**.**

Does not address any key questions

Linner, E. and Stromberg, U The course of untreated ocular hypertension. A tonographic study. Acta Ophthalmol (Copenh) 64; 42 (4): 836-48**.**

Does not address any key questions

Liu, C. J., Cheng, C. Y., and Hsu, W. M Scanning laser polarimetry with variable corneal compensation in primary angle-closure glaucoma. Ophthalmology 2008; 115 (8): 1334-9**.**

Does not address any key questions

Liu, X., Liang, Y. B., Ling, Y. L., Huang, J. J., and Zheng, X. P [The diagnostic ability of Heidelberg retina tomography to detect glaucomatous optic neuropathy in Chinese]. Zhonghua Yan Ke Za Zhi 2004; 40 (11): 737-40.

Foreign language

Liu, X., Ling, Y., Luo, R., Ge, J., and Zheng, X Optical coherence tomography in measuring retinal nerve fiber layer thickness in normal subjects and patients with open-angle glaucoma. Chin Med J (Engl) 2001; 114 (5): 524-9**.**

Infrequently used device: old OCT 2000

Liu, X., Ling, Y., Zheng, X., and Huang, J Study on stereometric parameters of optic nerve head of normal, big-cupped disk and glaucomatous eyes using Heidelberg retina tomograph Yan Ke Xue Bao 2000; 16 (3): 163-167**.**

Does not address any key questions

LiuX, LinYL, and ZhouWBZhengXP. [Qulitative and quantitative measurement of retinal nerve fiber layer in primery open angle glaucoma by optical coherence tomography]. [Zhonghua yan ke za zhi] Chinese journal of ophthalmology 2000; 36 (6): 420-425.

Foreign language

Lleo-Perez, A., Ortuno-Soto, A., Rahhal, M. S., Martinez-Soriano, F., and Sanchis-Gimeno, J. A Intraobserver reproducibility of retinal nerve fiber layer measurements using scanning laser polarimetry and optical coherence tomography in normal and ocular hypertensive subjects. Eur J Ophthalmol 2004; 14 (6): 523-30**.**

Does not address any key questions

Lockwood, A. J., Kirwan, J. F., and Ashleigh, Z Optometrists referrals for glaucoma assessment: A prospective survey of clinical data and outcomes. Eye 2010; 24 (9): 1515-1519**.**

Does not address any key questions

Lopez-Pena, M. J., Ferreras, A., Polo, V., Larrosa, J. M., and Honrubia, F. M [Relationship between standard automated perimetry and HRT, OCT and GDx in normal, ocular hypertensive and glaucomatous subjects]. Arch Soc Esp Oftalmol 2007; 82 (4): 197-208**.**

Does not address any key questions

Madjlessi, F.,Marx, W., Reinhard, T., Althaus, C., Sundmacher, R. [Impression and applanation tonometry in irregular corneas. Comparison with intraocular needle tonometry]. Ophthalmologe 2000; 97(7): 478-81.

Book Chapter

Madsen, B., Sponsel, W. E., and McKinnon, S Evaluation of VisionRx Computer Based Perimetry vs. Humphrey Visual Field. IOVS 2002; 43 : ARVO E-abstract 2174.

Abstract only

Maeda, H., Nakaura, M., and Negi, A New perimetric threshold test algorithm with dynamic strategy and tendency oriented perimetry (TOP) in glaucomatous eyes. Eye (Lond) 2000; 14 Pt 5 : 747-51**.**

Non-commercially available analysis of data

Magacho L, Marcondes AM, Costa VP. Correla gPo entre o top£grafo de disco £ptico (TOPSS) e Ændices do campo visual. Arq. Bras. Oftalmol 2004; 67(1):73-8.

Foreign language

Magacho, L., Marcondes, A. M., and Costa, V. P Correlation between optic disc topography and retinal nerve fibre layer measurements in glaucoma. Acta Ophthalmol Scand 2005; 83 (3): 322-7**.**

Does not address any key questions

Magacho, L., Marcondes, A. M., and Costa, V. P Discrimination between normal and glaucomatous eyes with scanning laser polarimetry and optic disc topography: A preliminary report. Eur. J. Ophthalmol. 2005; 15 (3): 353-359**.**

Other (specify): Outdated device

Mai, T. A., Reus, N. J., and Lemij, H. G Retinal nerve fiber layer measurement repeatability in scanning laser polarimetry with enhanced corneal compensation. J Glaucoma 2008; 17 (4): 269-74**.**

Does not address any key questions

Maino, A. P., Uddin, H. J., and Tullo, A. B A comparison of clinical performance between disposable and Goldmann tonometers. Eye (Lond) 2006; 20 (5): 574-8**.**

Data not abstractable

Malagola, R., Motolese, E. D., and De Luca, T [Long-term tonometry control of laser therapy of open-angle glaucoma]. Fortschr Ophthalmol 88; 85 (4): 366-8.

Foreign language

Mamikonian, V. R., Kazarian, E. E., Gloian, N. S., and Shmeleva-Demir, O. A [Comparative analysis of several morphometric parameters received using optic coherent tomography and scanning laser ophthalmoscopy in initial glaucoma diagnosis]. Vestn Oftalmol 2011; 127 (2): 18-20.

Foreign language

Manassakorn, A., Nouri-Mahdavi, K., and Caprioli, J Comparison of retinal nerve fiber layer thickness and optic disk algorithms with optical coherence tomography to detect glaucoma. Am J Ophthalmol 2006; 141 (1): 105-115**.**

Does not use clinical assessment as reference standard

Mansberger, S. L., Edmunds, B., Johnson, C. A., Kent, K. J., and Cioffi, G. A Community visual field screening: prevalence of follow-up and factors associated with follow-up of participants with abnormal frequency doubling perimetry technology results. Ophthalmic Epidemiol 2007; 14 (3): 134-40**.**

Does not address any key questions

Mansberger, S. L., Johnson, C. A., and Cioffi, G. A The results of screening frequency doubling technology perimetry in different locations of the community. J Glaucoma 2007; 16 (1): 73-80**.**

Does not address any key questions

Mansberger, S. L., Johnson, C. A., Cioffi, G. A., Choi, D., Krishnadas, S. R., Srinivasan, M., Balamurugan, V., Kim, U., Smith, S. D., Wilkins, J. H., and Gritz, D. C Predictive value of frequency doubling technology perimetry for detecting glaucoma in a developing country. J Glaucoma 2005; 14 (2): 128-34.

Covered by Burr

Mao, L. K., Stewart, W. C., and Shields, M. B Correlation between intraocular pressure control and progressive glaucomatous damage in primary open-angle glaucoma. Am J Ophthalmol 91; 111 (1): 51-5**.**

Does not address any key questions

Mao, L. K., Stewart, W. C., and Shields, M. B Correlation between intraocular pressure control and progressive glaucomatous damage in primary open-angle glaucoma. Am J Ophthalmol 91; 111 (1): 51-5**.**

Other (specify): Progression study

Marchini, G., Babighian, S., Specchia, L., and Perfetti, S Evaluation of the new Ocuton S tonometer. Acta Ophthalmol Scand 2002; 80 (2): 167-71**.**

Other (specify): reliability

Marchini, G., Babighian, S., Specchia, L., and Perfetti, S Evaluation of the new Ocuton S tonometer. Acta Ophthalmol Scand 2002; 80 (2): 167-71**.**

Other (specify): reliability only study

Marcon tM, Goldhart R, CorrWa ZMdS, Loeff RF, Souza RPd, Marcon AS. O campo visual azul-amarelo q mais sensÆvel que o campo visual branco-branco? Rev. Bras. Oftalmol 2003; 62(6):437-43.

Foreign language

Marcon, Italo Mundialino, Mello, Paulo Augusto de Arruda, Vacaro, Fbbio, and Marcon, Alexandre Seminoti. Campo visual no glaucoma de Gngulo aberto: estudo comparativo entre o campo visual computadorizado central e perifqrico. Arq. bras. oftalmol 96; 59 (1): 69-72.

Foreign language

Mardin, C. Y., Horn, F. K., Jonas, J. B., and Budde, W. M Preperimetric glaucoma diagnosis by confocal scanning laser tomography of the optic disc. Br J Ophthalmol 99; 83 (3): 299-304**.**

Infrequently used device: HRT1

Mardin, C. Y., Horn, F., Viestenz, A., Lammer, R., and Junemann, A [Healthy optic discs with large cups--a diagnostic challenge in glaucoma]. Klin Monbl Augenheilkd 2006; 223 (4): 308-14.

Foreign language

Mardin, C. Y., Hothorn, T., Peters, A., Junemann, A. G., Nguyen, N. X., and Lausen, B New glaucoma classification method based on standard Heidelberg Retina Tomograph parameters by bagging classification trees. J Glaucoma 2003; 12 (4): 340-6**.**

Non-commercially available analysis of data

Mardin, C. Y., Hothorn, T., Peters, A., Junemann, A. G., Nguyen, N. X., and Lausen, B New glaucoma classification method based on standard Heidelberg Retina Tomograph parameters by bagging classification trees. J Glaucoma 2003; 12 (4): 340-6**.**

Other: reference standard unclear

Marner, O [Glaucoma in Munster]. Ophthalmologe 98; 95 (1): 37-43.

Foreign language

Marques DMV, Rehder JRCL. AvaliagPo da viabilidade económica do HRT na prbtica oftalmol£gica dibria. Arq.Mqd. ABC 2004; 29(2):95-8.

Foreign language

Marre, Khauzmann, and Riulle. [Condition of the eyes 10 years after detection of increased intraocular pressure]. Vestn Oftalmol 77; (1): 14-6.

Foreign language

Martin, X. D., Fankhauser, F., and Rabineau, P. A Effects of timolol on visual-field mean retinal sensitivity in normal subjects. International ophthalmology 92; 16 (4-5): 325-9**.**

It does not address the adequate population

Martin-Boglind, L. and Wanger, P The effect of treatment on the results of high-pass resolution perimetry in glaucoma. Acta Ophthalmol (Copenh) 94; 72 (4): 423-8**.**

Does not address any key questions

Martinez, G. A., Sample, P. A., and Weinreb, R. N Comparison of high-pass resolution perimetry and standard automated perimetry in glaucoma. AM. J. OPHTHALMOL. 95; 119 (2): 195-201**.**

Does not examine candidate screening tests for glaucoma

Martus, P., Junemann, A., Wisse, M., Budde, W. M., Horn, F., Korth, M., and Jonas, J. B Multivariate approach for quantification of morphologic and functional damage in glaucoma. Invest Ophthalmol Vis Sci 2000; 41 (5): 1099-110**.**

Does not address any key questions

Martus, P., Korth, M., and Nguyen, N. X The value of blue-on yellow VEP for the early diagnosis of glaucoma. Biostatistical considerations and results: Wertigkeit des Blau-auf-Gelb-VEP fur die Fruhdiagnose bei Glaukomverdacht. Biostatistische Uberlegungen und Ergebnisse. OPHTHALMOLOGE 97; 94 (4): 277-281.

Foreign language

Mason, R. P., Kosoko, O., Wilson, M. R., Martone, J. F., Cowan, C. L. Jr, Gear, J. C., and Ross-Degnan, D National survey of the prevalence and risk factors of glaucoma in St. Lucia, West Indies. Part I. Prevalence findings. Ophthalmology 89; 96 (9): 1363-8**.**

Does not address any key questions

Mason, R. P., Kosoko, O., Wilson, M. R., Martone, J. F., Cowan, C. L. Jr, Gear, J. C., and Ross-Degnan, D National survey of the prevalence and risk factors of glaucoma in St. Lucia, West Indies. Part I. Prevalence findings. Ophthalmology 89; 96 (9): 1363-8**.**

It does not address the adequate population

Mastropasqua, L., Brusini, P., Carpineto, P., Ciancaglini, M., Di Antonio, L., Zeppieri, M. W., and Parisi, L Humphrey matrix frequency doubling technology perimetry and optical coherence tomography measurement of the retinal nerve fiber layer thickness in both normal and ocular hypertensive subjects. J Glaucoma 2006; 15 (4): 328-35**.**

It does not address the adequate population

Mathai, A., Thomas, R., Braganza, A., Maharajan, S., George, T., and Muliyil, J VISTECH contrast sensitivity testing in primary open angle glaucoma. Indian J Ophthalmol 97; 45 (2): 99-103**.**

Does not address any key questions

Mathai, A., Thomas, R., Braganza, A., Maharajan, S., George, T., and Muliyil, J VISTECH contrast sensitivity testing in primary open angle glaucoma. Indian J Ophthalmol 97; 45 (2): 99-103**.**

Does not examine candidate screening tests for glaucoma

Mattern, A., Stodtmeister, R., Pillunat, L. E., and Abel, T [Leydhecker tonography and Ulrich ocular pressure tonometry in probands with healthy eyes and glaucoma patients]. Fortschr Ophthalmol 89; 86 (4): 411-5.

Foreign language

Mattos TdCL, Kasahara N, Paolera MD, Cohen R, Mandia Junior C, Almeida GVd. Sensibilidade do est Æmulo de tamanho I na perimetria computadorizada acrombtica para a detecgPo de defeitos glaucomatosos no campo visual: anblise comparativa com as perimetrias de ondas curtas e acrombtica convencional (SITA). Arq. Bras. Oftalmol 2008; 71(2):142-8.

Foreign language

Mattos Tde, C., Kasahara, N., Della Paolera, M., Cohen, R., Mandia Junior, C., and Almeida, G. V [Sensitivity of size I stimulus in achromatic automated perimetry for detection of glaucomatous visual field defects: a comparative analysis with short wavelength automated perimetry and standard automated perimetry (SITA)]. Arq Bras Oftalmol 2008; 71 (2): 142-8.

Foreign language

Maul de la Puente E, G£mez P. CampimetrÆa y eco-doppler en glaucoma. Arch. Chil. Oftalmol 1997; 54(2):59-62.

Foreign language

Maul de la Puente E. La perimetrÆa computada en el glaucoma. Arch. Chil. Oftalmol 1997; 54(2):25-41.

Foreign language

Mayoral, F., Polo, V., Ferreras, A., Larrosa, J. M., Pueyo, V., and Honrubia, F [Diagnostic ability of stratus optical coherence tomography (OCT) in pre-perimetric glaucoma diagnosis]. Arch Soc Esp Oftalmol 2006; 81 (9): 537-44.

Foreign language

McKean-Cowdin, R., Wang, Y., Wu, J., Azen, S. P., and Varma, R Impact of visual field loss on health-related quality of life in glaucoma: the Los Angeles Latino Eye Study. Ophthalmology 2008; 115 (6): 941-948.e1**.**

Does not address any key questions

Medeiros, F. A., Sample, P. A., and Weinreb, R. N Frequency doubling technology perimetry abnormalities as predictors of glaucomatous visual field loss. Am J Ophthalmol 2004; 137 (5): 863-71**.**

Data not abstractable

Medeiros, F. A., Sample, P. A., Zangwill, L. M., Liebmann, J. M., Girkin, C. A., and Weinreb, R. N A statistical approach to the evaluation of covariate effects on the receiver operating characteristic curves of diagnostic tests in glaucoma. Invest Ophthalmol Vis Sci 2006; 47 (6): 2520-7**.**
Does not address any key questions

Medeiros, F. A., Weinreb, R. N., Zangwill, L. M., Alencar, L. M., Sample, P. A., Vasile, C., and Bowd, C Long-term intraocular pressure fluctuations and risk of conversion from ocular hypertension to glaucoma. Ophthalmology 2008; 115 (6): 934-40**.**
Does not address any key questions

Medeiros, F. A., Zangwill, L. M., Bowd, C., Bernd, A. S., and Weinreb, R. N Fourier analysis of scanning laser polarimetry measurements with variable corneal compensation in glaucoma. Invest Ophthalmol Vis Sci 2003; 44 (6): 2606-12**.**
Non-commercially available analysis of data

Medeiros, F. A., Zangwill, L. M., Bowd, C., Sample, P. A., and Weinreb, R. N Use of progressive glaucomatous optic disk change as the reference standard for evaluation of diagnostic tests in glaucoma. Am J Ophthalmol 2005; 139 (6): 1010-8**.**
Does not address any key questions

Medeiros, F. A., Zangwill, L. M., Bowd, C., Vasile, C., Sample, P. A., and Weinreb, R. N Agreement between stereophotographic and confocal scanning laser ophthalmoscopy measurements of cup/disc ratio: effect on a predictive model for glaucoma development. J Glaucoma 2007; 16 (2): 209-14**.**
Data not abstractable

Medical Services Advisory Committee (MSAC). Macular optical coherence tomography (OCT) for glaucoma (**Project Record**). Canberra: Medical Services Advisory Committee (MSAC) 2007; **Project Record**

Medved, N. and Cvenkel, B Diagnostic accuracy of the Moorfields Regression Analysis using the Heidelberg Retina Tomograph in glaucoma patients with visual field defects. Eur J Ophthalmol 2007; 17 (2): 216-22**.**
Does not examine candidate screening tests for glaucoma

Melo, G. B., Libera, R. D., Barbosa, A. S., Pereira, L. M., Doi, L. M., and Melo, L. A. Jr. Comparison of optic disk and retinal nerve fiber layer thickness in nonglaucomatous and glaucomatous patients with high myopia. Am J Ophthalmol 2006; 142 (5): 858-60**.**
Data not abstractable

Merle, H., Renard, A., Donnio, A., Richer, R., Ayeboua, L., Ensfelder, G., and Ventura, E [Glaucoma screening in Martinique. Results in 813 hospital employees]. J Fr Ophtalmol 2004; 27 (2): 136-42.
Foreign language

Metheetrairut, A., Singalavanija, A., Ruangvaravate, N., and Tuchinda, R Evaluation of screening tests and prevalence of glaucoma: integrated health research program for the Thai elderly. J Med Assoc Thai 2002; 85 (2): 147-53**.**
Does not examine candidate screening tests for glaucoma

Miglior, S., Albe, E., Guareschi, M., Rossetti, L., and Orzalesi, N Intraobserver and interobserver reproducibility in the evaluation of optic disc stereometric parameters by Heidelberg Retina Tomograph. Ophthalmology 2002; 109 (6): 1072-7**.**
Does not address any key questions

Miglior, S., Albe, E., Guareschi, M., Rossetti, L., and Orzalesi, N Intraobserver and interobserver reproducibility in the evaluation of optic disc stereometric parameters by Heidelberg Retina Tomograph. Ophthalmology 2002; 109 (6): 1072-7**.**
Other (specify): reliability study only

Miglior, S., Casula, M., Guareschi, M., Marchetti, I., Iester, M., and Orzalesi, N Clinical ability of Heidelberg Retinal Tomograph examination to detect glaucomatous visual field changes. Ophthalmology 2001; 108 (9): 1621-1627**.**
Other (specify): HRT1

Miglior, S., Guareschi, M., Albe', E., Gomarasca, S., Vavassori, M., and Orzalesi, N Detection of glaucomatous visual field changes using the Moorfields regression analysis of the Heidelberg retina tomograph. Am J Ophthalmol 2003; 136 (1): 26-33**.**
Other (specify): HRT1

Miglior, S., Guareschi, M., Romanazzi, F., Albe, E., Torri, V., and Orzalesi, N the impact of definition of primary open-angle glaucoma on the cross-sectional assessment of diagnostic validity of Heidelberg retinal tomography. Am J Ophthalmol 2005; 139 (5): 878-87**.**
Does not address any key questions

Miglior, S., Riva, I., Guareschi, M., Di Matteo, F., Romanazzi, F., Buffagni, L., and Rulli, E Retinal sensitivity and retinal nerve fiber layer thickness measured by optical coherence tomography in glaucoma. Am J Ophthalmol 2007; 144 (5): 733-740**.**
Does not address any key questions

Milla, E., Duch, S., Buchacra, O., and Masuet, C Poor agreement between Goldmann and Pascal tonometry in eyes with extreme pachymetry. Eye (Lond) 2009; 23 (3): 536-42**.**
Data not abstractable

Mills, R. P., Barnebey, H. S., Migliazzo, C. V., and Li, Y Does saving time using FASTPAC or suprathreshold testing reduce quality of visual fields?. Ophthalmology 94; 101 (9): 1596-603**.**
Does not address any key questions

Mills, R. P., Barnebey, H. S., Migliazzo, C. V., and Li, Y Does saving time using FASTPAC or suprathreshold testing reduce quality of visual fields?. Ophthalmology 94; 101 (9): 1596-603**.**
Does not examine candidate screening tests for glaucoma

Mistlberger, A., Liebmann, J. M., Greenfield, D. S., Pons, M. E., Hoh, S. T., Ishikawa, H., and Ritch, R Heidelberg retina tomography and optical coherence tomography in normal, ocular-hypertensive, and glaucomatous eyes. Ophthalmology 99; 106 (10): 2027-32**.**
Does not address any key questions

Mitchell, P., Leung, H., Wang, J. J., Rochtchina, E., Lee, A. J., Wong, T. Y., and Klein, R Retinal vessel diameter and open-angle glaucoma: the Blue Mountains Eye Study. Ophthalmology 2005; 112 (2): 245-50**.**
Does not address any key questions

Mocan, M. C., Bozkurt, B., Irkec, M., Orhan, M., and Karabulut, E The evaluation of retinal nerve fiber layer in pigment dispersion syndrome and pigmentary glaucoma using scanning laser polarimetry. Eur J Ophthalmol 2003; 13 (4): 377-82**.**
Does not address any key questions

Mohammadi, K., Bowd, C., Weinreb, R. N., Medeiros, F. A., Sample, P. A., and Zangwill, L. M Retinal nerve fiber layer thickness measurements with scanning laser polarimetry predict glaucomatous visual field loss. Am J Ophthalmol 2004; 138 (4): 592-601.
Does not address any key questions

Mok, K. H. and Lee, V. W Nerve fiber analyzer and short-wavelength automated perimetry in glaucoma suspects: a pilot study. Ophthalmology 2000; 107 (11): 2101-4.
Does not address any key questions

Mok, K. H., Lee, V. W., and So, K. F Retinal nerve fiber layer measurement by optical coherence tomography in glaucoma suspects with short-wavelength perimetry abnormalities. J Glaucoma 2003; 12 (1): 45-9.
Does not address any key questions

Mok, K. H., Lee, V. W., and So, K. F Retinal nerve fiber loss in high- and normal-tension glaucoma by optical coherence tomography. Optom Vis Sci 2004; 81 (5): 369-72.
Data not abstractable

Mok, K. H., Lee, V. W., and So, K. F Retinal nerve fiber loss pattern in high-tension glaucoma by optical coherence tomography. J Glaucoma 2003; 12 (3): 255-9.
Does not address any key questions

Molina, N., Milla, E., Bitrian, E., Larena, C., and Martinez, L [Comparison of Goldmann tonometry, pneumotonometry and the effect of the central corneal thickness]. Arch Soc Esp Oftalmol 2010; 85 (10): 325-8.
Foreign language

Moosavi, R., Ho, T. A., Verdon-Roe, G. M., Murdoch, I. E., and Garway-Heath, D. F Pilot Study to Assess the Acceptability and Reliability of Diagnostic Instruments for Glaucoma Case-Findings. IOVS 2006; 47 : ARVO E-abstract 3425.
Abstract only

Morales, J., Weitzman, M. L., and Gonzalez de la Rosa, M Comparison between Tendency-Oriented Perimetry (TOP) and octopus threshold perimetry. Ophthalmology 2000; 107 (1): 134-42.
Other (specify): no glaucoma subjects

Moreno-Montanes, J., Alvarez-Vidal, A., Sainz Gomez, C., and Rodriguez Conde, R [Retinal nerve fiber layer thickness in glaucomatous eyes. A comparative study between OCT and visual field]. Arch Soc Esp Oftalmol 2002; 77 (8): 435-41.
Foreign language

Moreno-Montanes, J., Maldonado, M. J., Garcia, N., Mendiluce, L., Garcia-Gomez, P. J., and Segui-Gomez, M Reproducibility and clinical relevance of the ocular response analyzer in nonoperated eyes: corneal biomechanical and tonometric implications. Invest Ophthalmol Vis Sci 2008; 49 (3): 968-74.
Does not address any key questions

Morgan-Davies, J., King, A. J., Aspinall, P., and O'Brien, C. J Measurement of a novel optic disc topographic parameter, "spikiness", in glaucoma. Graefes Arch Clin Exp Ophthalmol 2000; 238 (8): 669-76.
Does not address any key questions

Morgan-Davies, J., Taylor, N., Hill, A. R., Aspinall, P., O'Brien, C. J., and Azuara-Blanco, A Three dimensional analysis of the lamina cribrosa in glaucoma. Br J Ophthalmol 2004; 88 (10): 1299-304.
Does not address any key questions

Mosaed, S., Chamberlain, W. D., Liu, J. H., Medeiros, F. A., and Weinreb, R. N Association of central corneal thickness and 24-hour intraocular pressure fluctuation. J Glaucoma 2008; 17 (2): 85-8.
Does not address any key questions

Mota, F. J. and Shafranoy, G COMPARISON OF FREQUENCY DOUBLING TECHNOLOGY AND SWEDISH INTERACTIVE TECHNOLOGY ALGORTHM PERIMETRY. IOVS 2000; 41 : ARVO Abstract 1505.
Abstract only

Moura CRd, Mello PAdA, Prata J•nior JA. Scanning laser polarimetry in glaucomatous and nonglaucomatous Brazilian subjects. Arq. Bras. Oftalmol 2003; 66(6):749-54.
Foreign language

Mukesh, B. N., McCarty, C. A., Rait, J. L., and Taylor, H. R Five-year incidence of open-angle glaucoma: the visual impairment project. Ophthalmology 2002; 109 (6): 1047-51.
Does not address any key questions

Mwanza, J. C., Oakley, J. D., Budenz, D. L., and Anderson, D. R Ability of cirrus HD-OCT optic nerve head parameters to discriminate normal from glaucomatous eyes. Ophthalmology 2011; 118 (2): 241-8.e1.
It does not address the adequate population

Nakano, T., Tatemichi, M., Miura, Y., Sugita, M., and Kitahara, K Long-term physiologic changes of intraocular pressure: a 10-year longitudinal analysis in young and middle-aged Japanese men. Ophthalmology 2005; 112 (4): 609-16.
Does not address any key questions

Nam, Y. P., Park, S. B., Kang, S. Y., Sung, K. R., and Kook, M. S Glaucoma diagnostic performance of humphrey matrix and standard automated perimetry. Jpn J Ophthalmol 2009; 53 (5): 482-5.
Other (specify): non standard analysis of data

Nazemi, P., Fink, W., Sadun, A. A, Minckler, D. S, and Francis, B. A. EARLY DETECTION OF GLAUCOMA BY A NOVEL COMPUTER AUTOMATED 3-D VISUAL FIELD TEST. American Academy of Ophthalmology 2001; : 159-60.
Does not address any key questions

Nemesure, B., Honkanen, R., Hennis, A., Wu, S. Y., and Leske, M. C Incident open-angle glaucoma and intraocular pressure. Ophthalmology 2007; 114 (10): 1810-5.
Does not address any key questions

Nesterov, A. P., Dzhafarli, T. B., and Illarionova, A. R [Use of transpalpebral tonometry in the estimation of intraocular pressure in patients with refractory anomaly before and after keratophotorefraction interventions]. Vestn Oftalmol 2007; 123 (6): 41-3.
Foreign language

Ng, D., Zangwill, L. M., Racette, L., Bowd, C., Pascual, J. P., Bourne, R. R., Boden, C., Weinreb, R. N., and Sample, P. A Agreement and repeatability for standard automated perimetry and confocal scanning laser ophthalmoscopy in the diagnostic innovations in glaucoma study. Am J Ophthalmol 2006; 142 (3): 381-6**.**

Data not abstractable

Nguyen, N. X., Horn, F. K., Hayler, J., Wakili, N., Junemann, A., and Mardin, C. Y Retinal nerve fiber layer measurements using laser scanning polarimetry in different stages of glaucomatous optic nerve damage. Graefes Arch Clin Exp Ophthalmol 2002; 240 (8): 608-14**.**

Does not address any key questions

Nguyen, R. L., Raja, S. C., and Traboulsi, E. I Screening relatives of patients with familial chronic open angle glaucoma. Ophthalmology 2000; 107 (7): 1294-7**.**

Does not address any key questions

Nicolela, M. T., Martinez-Bello, C., Morrison, C. A., LeBlanc, R. P., Lemij, H. G., Colen, T. P., and Chauhan, B. C Scanning laser polarimetry in a selected group of patients with glaucoma and normal controls. Am J Ophthalmol 2001; 132 (6): 845-54**.**

Non-commercially available analysis of data

Niessen, A. G., Langerhorst, C. T., Geijssen, H. C., and Greve, E. L Design of low cost glaucoma screening. Doc Ophthalmol 97; 93 (4): 293-315**.**

Does not address any key questions

Nirmalan, P. K., Katz, J., Robin, A. L., Ramakrishnan, R., Krishnadas, R., Thulasiraj, R. D., and Tielsch, J. M Female reproductive factors and eye disease in a rural south Indian population: The Aravind Comprehensive Eye Survey. Invest. Ophthalmol. Vis. Sci. 2004; 45 (12): 4273-4276**.**

Does not examine candidate screening tests for glaucoma

Nirmalan, P. K., Katz, J., Robin, A. L., Ramakrishnan, R., Krishnadas, R., Thulasiraj, R. D., and Tielsch, J. M Female reproductive factors and eye disease in a rural south Indian population: The Aravind Comprehensive Eye Survey. Invest. Ophthalmol. Vis. Sci. 2004; 45 (12): 4273-4276**.**

Other (specify): prevalence study

Nishimura, K., Iwase, A., Tomita, G., Yamamoto, T., and Kitazawa, Y Temporal modulation transfer function in normal-tension glaucoma patients. Jpn J Ophthalmol 98; 42 (2): 146-51**.**

Does not address any key questions

Nizankowska, M. H. and Kaczmarek, R [Prevalance of open angle glaucoma and ocular hypertension as a risk factor for primary open angle glaucoma in Wroclaw population. Wroclaw Epidemiology Study]. Klin Oczna 2004; 106 (1-2 Suppl): 147-52.

Foreign language

Nizankowska, M. H. and Kaczmarek, R Prevalence of glaucoma in the wroclaw population. The wroclaw epidemiological study. Ophthalmic Epidemiol 2005; 12 (6): 363-71**.**

Does not address any key questions

Nizankowska, M. H., Kaczmarek, R., and Jakubaszko, J Detection level of glaucoma and ocular hypertension in Wroclaw population - Wroclaw Epidemiological Study: Poziom wykrywalnosci jaskry i nadcisnienia ocznego w populacji wroclawskiej - Wroclawskie Badania Epidemiologiczne. Adv. Clin. Exp. Med. 2004; 13 (4): 607-613.

Foreign language

Nogueira, Nilce Maria de Carvalho. Perimetria manual e perimetria autombtica (Perimetron) no glaucoma: estudo comparativo. Rev. bras. oftalmol 89; 48 (5): 338-47.

Foreign language

Nolan, W. P., Ganzorig, S., Undraa, A., Uranchimeg, D., Baasanhu, J., and Johnson, G. J RANDOMIZED CONTROLLED TRIAL OF SCREENING FOR PRIMARY ANGLE-CLOSURE IN MONGOLIA. IOVS 2000; 41 : ARVO Abstract 2530.

Abstract only

Nomoto, H., Matsumoto, C., Takada, S., Hashimoto, S., Arimura, E., Okuyama, S., and Shimomura, Y Detectability of glaucomatous changes using SAP, FDT, flicker perimetry, and OCT. J Glaucoma 2009; 18 (2): 165-71**.**

Data not abstractable

Nordmann, J. P., Brion, F., Hamard, P., and Mouton-Chopin, D Evaluation of the SITA Standard and SITA Fast perimetric algorithms in normals and glaucoma patients. Journal Francais D'Ophtalmologie 98; 21 (8): 549-554.

Foreign language

Nordmann, J. P., Mesbah, M., and Berdeaux, G Scoring of visual field measured through Humphrey perimetry: principal component varimax rotation followed by validated cluster analysis. Invest Ophthalmol Vis Sci 2005; 46 (9): 3169-76**.**

Data not abstractable

Norskov, K Glaucoma screening. II. A five-year follow-up carried through in relation to a glaucoma screening among members of the volunteer donor corps of the Island of Falster (Denmark). Acta Ophthalmol (Copenh) 70; 48 (3): 418-33**.**

Does not address any key questions

Norskov, K Routine tonometry for detection of glaucoma in in-patients, with a five-year follow-up. Acta Ophthalmol (Copenh) 67; 45 (4): 536-45**.**

Does not address any key questions

Norskov, K Routine tonometry in ophthalmic practice. II. Five-year follow-up. Acta Ophthalmol (Copenh) 70; 48 (5): 873-95**.**

Does not address any key questions

North, R. V., Jones, A. L., Hunter, E., Morgan, J. E., and Wild, J. M Evaluation of the high specificity Screening Program (C-20-1) of the Frequency Doubling Technology (FDT) perimeter in clinical practice. Eye (Lond) 2006; 20 (6): 681-7**.**

Does not address any key questions

Nouri-Mahdavi, K., Hoffman, D., Tannenbaum, D. P., Law, S. K., and Caprioli, J Identifying early glaucoma with optical coherence tomography. Am J Ophthalmol 2004; 137 (2): 228-35**.**

Other: OCT II

Ntim-Amponsah, C. T., Amoaku, W. M., Ofosu-Amaah, S., Ewusi, R. K., Idirisuriya-Khair, R., Nyatepe-Coo, E., and Adu-Darko, M Prevalence of glaucoma in an African population. Eye (Lond) 2004; 18 (5): 491-7**.**

Does not address any key questions

Nukada, M., Hangai, M., Mori, S., Nakano, N., Nakanishi, H., Ohashi-Ikeda, H., Nonaka, A., and Yoshimura, N Detection of localized retinal nerve fiber layer defects in glaucoma using enhanced spectral-domain optical coherence tomography. Ophthalmology 2011; 118 (6): 1038-48**.**

Is a case series of less than 100 participants/eyes

Oddone, F., Centofanti, M., Rossetti, L., Iester, M., Fogagnolo, P., Capris, E., and Manni, G Exploring the Heidelberg Retinal Tomograph 3 diagnostic accuracy across disc sizes and glaucoma stages: a multicenter study. Ophthalmology 2008; 115 (8): 1358-65, 1365.e1-3**.**

Non-commercially available analysis of data

Odland, M. and Aasved, H Follow-up of initially nonglaucomatous patients with fibrillopathia epitheliocapsularis (so-called senile exfoliation of the anterior lens capsule). Acta Ophthalmol Suppl 73; 120 : 77-81**.**

Does not address any key questions

O'Donoghue, E., Hitchings, R. and others. The pattern of electroretinogram (PERG) and glaucoma screening [abstract]. Ir-J-Med-Sci 91; 160 (10): 323.

Abstract only

Onal, S., Yenice, O., Cakir, S., and Temel, A FACT contrast sensitivity as a diagnostic tool in glaucoma: FACT contrast sensitivity in glaucoma. Int Ophthalmol 2008; 28 (6): 407-12**.**

Does not address any key questions

Ong, L. S., Mitchell, P., Healey, P. R., and Cumming, R. G Asymmetry in optic disc parameters: the Blue Mountains Eye Study. Invest Ophthalmol Vis Sci 99; 40 (5): 849-57**.**

Does not address any key questions

Osaki, T. H., Kasahara, N., Paolera, M. D., Cohen, R., and Nishiwaki-Dantas, M. C Presentation of glaucoma in an urban tertiary care hospital in South America: Legal blindness and prevalence. Int. Ophthalmol. 2010; 30 (4): 361-366**.**

Does not address any key questions

Oshitari, T., Fujimoto, N., Hanawa, K., Adachi-Usami, E., and Roy, S Effect of chronic hyperglycemia on intraocular pressure in patients with diabetes. Am J Ophthalmol 2007; 143 (2): 363-5**.**

Does not address any key questions

Ourgaud, M Static circular perimetry in open-angle glaucoma: LA PERIMETRIE CIRCULAIRE STATIQUE DANS LE GLAUCOME CHRONIQUE A ANGLE OUVERT. J. FR. OPHTALMOL. 82; 5 (6-7): 387-391.

Foreign language

Ozdek, S. C., Onol, M., and Hasanreisoglu, B Nerve fiber layer assessment with scanning laser polarimetry in glaucoma patients and glaucoma suspects. Eur J Ophthalmol 2001; 11 (2): 139-44**.**

Does not address any key questions

Ozturk, F., Yavas, G. F., Kusbeci, T., and Ermis, S. S A comparison among Humphrey field analyzer, Microperimetry, and Heidelberg Retina Tomograph in the evaluation of macula in primary open angle glaucoma. J Glaucoma 2008; 17 (2): 118-21**.**

Does not address any key questions

Pablo, L. E., Ferreras, A., and Schlottmann, P. G Retinal nerve fibre layer evaluation in ocular hypertensive eyes using optical coherence tomography and scanning laser polarimetry in the diagnosis of early glaucomatous defects. Br J Ophthalmol 2011; 95 (1): 51-5**.**

It does not address the adequate population

Pache, M., Wilmsmeyer, S., Lautebach, S., and Funk, J Dynamic contour tonometry versus Goldmann applanation tonometry: a comparative study. Graefes Arch Clin Exp Ophthalmol 2005; 243 (8): 763-7**.**

Data not abstractable

Paczka, J. A., Friedman, D. S., Quigley, H. A., Barron, Y., and Vitale, S Diagnostic capabilities of frequency-doubling technology, scanning laser polarimetry, and nerve fiber layer photographs to distinguish glaucomatous damage. Am J Ophthalmol 2001; 131 (2): 188-97**.**

Does not examine candidate screening tests for glaucoma

Pankow, L. J., Pryor, J. L., and Luchins, D. J Glaucoma screening of patients with and without dementia. J Evid Based Soc Work 2009; 6 (1): 29-39**.**

Does not address any key questions

Pankow, L. J., Pryor, J. L., and Luchins, D. J Glaucoma screening of patients with and without dementia. J Evid Based Soc Work 2009; 6 (1): 29-39**.**

Other: not a screening device

Papadia, M., Sofianos, C., Iester, M., Bricola, G., Mete, M., and Traverso, C. E Corneal thickness and visual field damage in glaucoma patients. Eye (Lond) 2007; 21 (7): 943-7**.**

Does not address any key questions

Parikh, R. S., Parikh, S. R., and Thomas, R Diagnostic capability of macular parameters of Stratus OCT 3 in detection of early glaucoma. Br J Ophthalmol 2010; 94 (2): 197-201**.**

Uses single test to diagnose glaucoma

Parikh, R., Muliyil, J., George, R., Bhat, S., and Thomas, R Repeatability of frequency doubling technology perimetry (20-1 screening program) and the effect of pupillary dilatation on interpretation. Ophthalmic Epidemiol 2008; 15 (1): 42-6**.**

Does not address any key questions

Park, H. J. and Caprioli, J Circumferential profiles of peripapillary surface height with confocal scanning laser ophthalmoscopy. Korean J Ophthalmol 97; 11 (1): 7-14**.**

Infrequently used device: outdated

Park, H. J. and Caprioli, J Circumferential profiles of peripapillary surface height with confocal scanning laser ophthalmoscopy. Korean J Ophthalmol 97; 11 (1): 7-14**.**

Other: outdated device

Patel, A., Wollstein, G., Ishikawa, H., and Schuman, J. S. Comparison of Glaucomatous Visual Field Defects Using Matrix Perimetry and Swedish Interactive Thresholding Algorithm (SITA) Perimetry. IOVS 2005; 46 : ARVO E-abstract 3721.

Abstract only

Paterson, G A nine-year follow-up of studies on first-degree relatives of patients with glaucoma simplex. Trans Ophthalmol Soc U K 70; 90 : 515-25**.**

Does not address any key questions

Paterson, G A nine-year follow-up of studies on first-degree relatives of patients with glaucoma simplex. Trans Ophthalmol Soc U K 70; 90 : 515-25**.**

No original data (e.g., systematic review, narrative review, editorial, letter)

Peeters, A., Schouten, J. S. A. G., Webers, C. A. B., Prins, M. H., Hendrikse, F., and Severens, J. L Cost-effectiveness of early detection and treatment of ocular hypertension and primary open-angle glaucoma by the ophthalmologist. Eye 2008; 22 (3): 354-362**.**

Does not address any key questions

Peeters, H., Debeer, Ph., Groenen, P., Van Esch, H., Vanderlinden, G., Eyskens, B., Mertens, L., Gewillig, M., Van De Ven, W., Fryns, J. P., and Devriendt, K Inheritance of open-angle glaucoma in the Barbados family study. Am. J. Med. Genet. 2001; 103 (1): 36-43**.**

Does not address any key questions

Peeters, H., Debeer, Ph., Groenen, P., Van Esch, H., Vanderlinden, G., Eyskens, B., Mertens, L., Gewillig, M., Van De Ven, W., Fryns, J. P., and Devriendt, K Inheritance of open-angle glaucoma in the Barbados family study. Am. J. Med. Genet. 2001; 103 (1): 36-43**.**

Does not examine candidate screening tests for glaucoma

Pennebaker, G. E. and Stewart, W. C Temporal visual field in glaucoma: a re-evaluation in the automated perimetry era. Graefes Arch Clin Exp Ophthalmol 92; 230 (2): 111-4**.**

Does not address any key questions

Perez-Inigo, A., Polo, V., Larrosa, J. M., Ferreras, A., Sanchez-Cano, A., Martinez-de-la-Casa, J. M., and Honrubia, F. M [Correlation between standard automated perimetry global indices and Heidelberg Retina Tomograph II parameters]. Arch Soc Esp Oftalmol 2007; 82 (7): 401-11**.**

Does not address any key questions

Perkins, E. S The Bedford glaucoma survey. I. Long-term follow-up of borderline cases. Br J Ophthalmol 73; 57 (3): 179-85**.**

Does not address any key questions

Perkins, E. S The Bedford glaucoma survey. I. Long-term follow-up of borderline cases. Br J Ophthalmol 73; 57 (3): 179-85**.**

It does not address the adequate population

Perkins, E. S The Bedford glaucoma survey. II. Rescreening of normal population. Br J Ophthalmol 73; 57 (3): 186-92**.**

Does not address any key questions

Perkins, E. S The Bedford glaucoma survey. II. Rescreening of normal population. Br J Ophthalmol 73; 57 (3): 186-92**.**

Other (specify): REscreeniing

Perls, E., Borrass, R., Ondategui, J. C., and Goqi, J SITA VS STANDARD PERIMETRY IN GLAUCOMA: A COMPARATIVE STUDY. American Academy of Optometry 97; : 114.

Abstract only

Pierre Filho, P. T P, Schimiti, R. B, Vasconcellos, J. P, and Costa, V. P. Sensitivity and Specificity of Frequency Doubling Technology, Tendency Oriented Perimetry, SITA Standard, and SITA Fast in Patients Undergoing Automated Perimetry for the First Time. IOVS 2005; 46 : ARVO E-abstract 3723.

Abstract only

Pitz, S., Kramann, C., Krummenauer, F., Pitz, A., Trabert, G., and Pfeiffer, N Is homelessness a risk factor for eye disease? Results of a German screening study. Ophthalmologica 2005; 219 (6): 345-349**.**

Does not address any key questions

Plange, N., Remky, A., Huber, K., Hendricks, S., and Arend, O [Contrast sensitivity, blue-yellow-perimetry and retinal hemodynamic during the treatment of glaucoma]. Ophthalmologe. 2001; 98 (Suppl 1): S138-9.

Foreign language

Plummer, D. J., Lopez, A., Azen, S. P., LaBree, L., Bartsch, D. U., Sadun, A. A., and Freeman, W. R Correlation between static automated and scanning laser entoptic perimetry in normal subjects and glaucoma patients. Ophthalmology 2000; 107 (9): 1693-701**.**

Infrequently used device: entoptic perimetry

Poli, A., Strouthidis, N. G., Ho, T. A., and Garway-Heath, D. F Analysis of HRT images: comparison of reference planes. Invest Ophthalmol Vis Sci 2008; 49 (9): 3970-5**.**

Does not address any key questions

Polo Llorens, V., Pablo Julvez, L. E., Pinilla Lozano, I., Larrosa Poves, J. M., Ruiz Moreno, O., and Honrubia Lopez, F. M [Short-wavelength automated perimetry (SWAP) in patients with suspected glaucoma (II): correlation with a probabilistic multifactorial model of risk for developing glaucomatous damage]. Arch Soc Esp Oftalmol 2000; 75 (2): 97-102**.**

It does not address the adequate population

Polo Llorens, V., Pablo Julvez, L. E., Pinilla Lozano, I., Larrosa Poves, J. M., Ruiz Moreno, O., and Honrubia Lopez, F. M [Short-wavelength automated perimetry (SWAP) in patients with suspected glaucoma (II): correlation with a probabilistic multifactorial model of risk for developing glaucomatous damage]. Arch Soc Esp Oftalmol 2000; 75 (2): 97-102**.**

Other (specify): All subjects abnormal- no normal controls

Polo, V., Abecia, E., Pablo, L. E., Pinilla, I., Larrosa, J. M., and Honrubia, F. M Functional and structural measurements in a multifactorial glaucoma risk model. Acta Ophthalmol Scand 2001; 79 (1): 10-4**.**

Does not address any key questions

Polo, V., Abecia, E., Pablo, L. E., Pinilla, I., Larrosa, J. M., and Honrubia, F. M Short-wavelength automated perimetry and retinal nerve fiber layer evaluation in suspected cases of glaucoma. Arch Ophthalmol 98; 116 (10): 1295-8**.**

Does not address any key questions

Polo, V., Larrosa, J. M., Pinilla, I., Pablo, L., and Honrubia, F. M Optimum criteria for short-wavelength automated perimetry. Ophthalmology 2001; 108 (2): 285-9**.**

Non-commercially available analysis of data

Pons, M. E., Ishikawa, H., Gurses-Ozden, R., Liebmann, J. M., Dou, H. L., and Ritch, R Assessment of retinal nerve fiber layer internal reflectivity in eyes with and without glaucoma using optical coherence tomography. Arch Ophthalmol 2000; 118 (8): 1044-7**.**

Does not address any key questions

Postaire, J. G., Hache, J. C., and Diaf, M Fully automated screening procedure for early detection of visual field defects. J Biomed Eng 86; 8 (2): 156-61**.**

Infrequently used device

Pueyo, V., Larrosa, J. M., Polo, V., Perez-Inigo, A., Ferreras, A., and Honrubia, F. M [Sector-based analysis of the distribution of the neuroretinal rim by confocal scanning laser in the diagnosis of glaucoma]. Arch Soc Esp Oftalmol 2006; 81 (3): 135-40.

Foreign language

Pueyo, V., Polo, V., Larrosa, J. M., Ferreras, A., Martinez-de-la-Casa, J. M., and Honrubia, F. M [Diagnostic usefulness of optical coherence tomography (OCT), scanning laser tomography (HRT-II) and laser polarimetry (GDx) in open-angle glaucoma]. Arch Soc Esp Oftalmol 2006; 81 (12): 693-700.

Foreign language

Punjabi, O. S., Stamper, R. L., Bostrom, A. G., Han, Y., and Lin, S. C Topographic comparison of the visual function on multifocal visual evoked potentials with optic nerve structure on heidelberg retinal tomography. Ophthalmology 2008; 115 (3): 440-6**.**

Does not address any key questions

Qi, S. and Jiang, Y [Short-wavelength perimetry in diagnosis of early glaucoma: comparison with standard automated perimetry]. Zhonghua Yan Ke Za Zhi 2002; 38 (1): 31-5.

Foreign language

Quigley, H. A., West, S. K., Rodriguez, J., Munoz, B., Klein, R., and Snyder, R The prevalence of glaucoma in a population-based study of Hispanic subjects: Proyecto VER. Arch Ophthalmol 2001; 119 (12): 1819-26**.**

Does not address any key questions

Rabin, S., Kolesar, P., Podos, S. M., and Wilensky, J. T A visual field screening protocol for glaucoma. Am J Ophthalmol 81; 92 (4): 630-5**.**

Does not use clinical assessment as reference standard

Ramakrishnan, R., Nirmalan, P. K., Krishnadas, R., Thulasiraj, R. D., Tielsch, J. M., Katz, J., Friedman, D. S., and Robin, A. L Glaucoma in a rural population of southern India: the Aravind comprehensive eye survey. Ophthalmology 2003; 110 (8): 1484-90**.**

Does not address any key questions

Ramirez, A. M., Chaya, C. J., Gordon, L. K., and Giaconi, J. A A comparison of semiautomated versus manual Goldmann kinetic perimetry in patients with visually significant glaucoma. J Glaucoma 2008; 17 (2): 111-7**.**

Does not address any key questions

Ramrattan, R. S., Wolfs, R. C., Panda-Jonas, S., Jonas, J. B., Bakker, D., Pols, H. A., Hofman, A., and de Jong, P. T Prevalence and causes of visual field loss in the elderly and associations with impairment in daily functioning: the Rotterdam Study. Arch Ophthalmol 2001; 119 (12): 1788-94**.**

Does not address any key questions

Rao, H. L., Babu, G. J., and Sekhar, G. C Comparison of the diagnostic capability of the Heidelberg Retina Tomographs 2 and 3 for glaucoma in the Indian population. Ophthalmology 2010; 117 (2): 275-81**.**

Testing in-house scoring system only

Rasmussen, K. E. and Jorgensen, H. A Diagnostic value of the water-drinking test in early detection of simple glaucoma. Acta Ophthalmol (Copenh) 76; 54 (2 p): 160-6**.**

Does not address any key questions

Raulli, A., Johnston, R., Petherick, E., and Hollingsworth, B Multifocal multichannel objective perimetry (Structured abstract). Medical Services Advisory Committee 2002; : 51**.**

No original data (e.g., systematic review, narrative review, editorial, letter)

Raychaudhuri, A., Lahiri, S. K., Bandyopadhyay, M., Foster, P. J., Reeves, B. C., and Johnson, G. J A population based survey of the prevalence and types of glaucoma in rural West Bengal: the West Bengal Glaucoma Study. Br J Ophthalmol 2005; 89 (12): 1559-64**.**

Does not address any key questions

Realini, T., Lai, M. Q., and Barber, L Impact of diabetes on glaucoma screening using frequency-doubling perimetry. Ophthalmology 2004; 111 (11): 2133-6**.**

Does not address any key questions

Regan, D. and Neima, D Balance between pattern and flicker sensitivities in the visual fields of ophthalmological patients. Br J Ophthalmol 84; 68 (5): 310-5**.**

Does not address any key questions

Regiec, P. and Nizankowska, M. H [Evaluation of acquired color vision defects by means of the two equation method in primary open-angle glaucoma with normal pressure and in patients from the risk group]. Klinika oczna 97; 99 (4): 245-8**.**

Does not address any key questions

Regine, F., Scuderi, G. L., Cesareo, M., Ricci, F., Cedrone, C., and Nucci, C Validity and limitations of the Nidek NT-4000 non-contact tonometer: A clinical study. Ophthalmic Physiol. Opt. 2006; 26 (1): 33-39**.**

Does not address any key questions

Ren, B.-C., He, Y., Chen, L., Yang, J.-G., and Sun, N.-X Epidemiology of glaucoma in a rural population in Shaanxi Province. Int. J. Ophthalmol. 2005; 5 (5): 1037-1042.

Foreign language

Reus, N. J. and Lemij, H. G Scanning laser polarimetry of the retinal nerve fiber layer in perimetrically unaffected eyes of glaucoma patients. Ophthalmology 2004; 111 (12): 2199-203**.**

Does not address any key questions

Robin, T. A., Muller, A., Rait, J., Keeffe, J. E., Taylor, H. R., and Mukesh, B. N Performance of community-based glaucoma screening using Frequency Doubling Technology and Heidelberg Retinal Tomography. Ophthalmic Epidemiol 2005; 12 (3): 167-78**.**

Data not abstractable

Rodriguez-Maimon, E. B., Ferreras, A., Polo, V., Larrosa, J. M., Alias, E., and Honrubia, F. M Evaluation of four new discriminant functions for HRT II in glaucoma diagnosis: Evaluacion de cuatro nuevas funciones discriminantes del HRT II para el diagnostico del glaucoma. Arch. Soc. Esp. Oftalmol. 2008; 83 (6): 349-356.
Foreign language

Rohrschneider, K., Burk, R. O., Kruse, F. E., and Volcker, H. E Reproducibility of the optic nerve head topography with a new laser tomographic scanning device. Ophthalmology 94; 101 (6): 1044-9**.**
Does not address any key questions

Rosenthal, A. R. and Perkins, E. S Family studies in glaucoma. Br J Ophthalmol 85; 69 (9): 664-7**.**
Does not address any key questions

Rossetti, L., Fogagnolo, P., Mazzolani, F., Incarnato, N., and Orzalesi, N Detection of Early Glaucoma With FDT and SWAP: The Results of a Longitudinal Study. IOVS 2005; 46 : ARVO E-abstract 2486.
Abstract only

Rouhiainen, H. and Terasvirta, M Incidence of open-angle glaucoma and screening of the intraocular pressure with a non-contact tonometer. Acta Ophthalmol (Copenh) 90; 68 (3): 344-6**.**
Does not address any key questions

Rowe, F. J., Sueke, H., and Gawley, S. D Comparison of Damato campimetry and Humphrey automated perimetry results in a clinical population. Br J Ophthalmol 2010; 94 (6): 757-62**.**
Infrequently used device: Damato campimetry

Ruben, S. T., Arden, G. B., O'Sullivan, F., and Hitchings, R. A Pattern electroretinogram and peripheral colour contrast thresholds in ocular hypertension and glaucoma: Comparison and correlation of results. BR. J. OPHTHALMOL. 95; 79 (4): 326-331**.**
Does not examine candidate screening tests for glaucoma

Sah, R. P., Badhu, B. P., Pokharel, P. K., Thakur, S. K., Das, H., and Panda, A Prevalence of glaucoma in Sunsari district of eastern Nepal. Kathmandu Univ Med J (KUMJ) 2007; 5 (3): 343-8**.**
Does not address any key questions

Sakata, K., Sakata, L. M., Sakata, V. M., Santini, C., Hopker, L. M., Bernardes, R., Yabumoto, C., and Moreira, A. T. R Prevalence of glaucoma in a South Brazilian population: Projeto glaucoma. Invest. Ophthalmol. Vis. Sci. 2007; 48 (11): 4974-4979**.**
Does not address any key questions

Sakata, L. M., DeLeon, J. O., Arthur, S. N., and Girkin, C. A Detecting Visual Function Abnormalities in Patients With Glaucomatous Optic Neuropathy Using Matrix Frequency-Doubling Perimetry and SITA-Standard Perimetry. IOVS 2006; 47 : ARVO E-abstract 1125.
Abstract only

Salgarello, T., Colotto, A., Valente, P., Petrocelli, G., Galan, M. E., Scullica, L., and Falsini, B Posterior pole retinal thickness in ocular hypertension and glaucoma: early changes detected by hemispheric asymmetries. J Glaucoma 2005; 14 (5): 375-83**.**
Data not abstractable

Sampaolesi, R. and Sampaolesi, J. R Correlation between the intraocular pressure according to daily pressure curves and optic disc changes in patients with open-angle glaucoma with normal visual fields. Lasers Light Ophthalmol. 98; 8 (3): 179-185**.**
Does not address any key questions

Sample, P. A. and Weinreb, R. N Color perimetry for assessment of primary open-angle glaucoma. Invest Ophthalmol Vis Sci 90; 31 (9): 1869-75**.**
Does not address any key questions

Sample, P. A., Bosworth, C. F., and Weinreb, R. N Short-wavelength automated perimetry and motion automated perimetry in patients with glaucoma. ARCH. OPHTHALMOL. 97; 115 (9): 1129-1133**.**
Does not address any key questions

Sample, P. A., Bosworth, C. F., Blumenthal, E. Z., Girkin, C., and Weinreb, R. N Visual function-specific perimetry for indirect comparison of different ganglion cell populations in glaucoma. Invest Ophthalmol Vis Sci 2000; 41 (7): 1783-90**.**
Data not abstractable

Samson, D. and Aronson, N Retinal nerve fiber layer analysis for the diagnosis and management of glaucoma (Provisional abstract). Blue Cross and Blue Shield Association, Technology Evaluation Center 2003; : 32.
No library is able to supply this item

Sanchez-Cano, A., Baraibar, B., Pablo, L. E., and Honrubia, F Scanning laser polarimetry with variable corneal compensation to detect preperimetric glaucoma using logistic regression analysis. Ophthalmologica 2009; 223 (4): 256-62**.**
Infrequently used device

Sanchez-Galeana, C., Bowd, C., Blumenthal, E. Z., Gokhale, P. A., Zangwill, L. M., and Weinreb, R. N Using optical imaging summary data to detect glaucoma. Ophthalmology 2001; 108 (10): 1812-8**.**
Other: HRT-GDX

Sanfilippo, P. G., Cardini, A., Sigal, I. A., Ruddle, J. B., Chua, B. E., Hewitt, A. W., and Mackey, D. A A geometric morphometric assessment of the optic cup in glaucoma. Exp Eye Res 2010; 91 (3): 405-14**.**
Does not use clinical assessment as reference standard

Santos RMO, Cronemberger S, Vieira Filho HM, Calixto N. Estudo comparativo das diferen gas entre as estratqgias dinGmica e normal com o perÆmetro Octopus 1-2-3. Arq. Bras. Oftalmol 1999; 62(6):727-30.
Foreign language

Sato, S., Hirooka, K., Baba, T., Yano, I., and Shiraga, F Correlation between retinal nerve fibre layer thickness and retinal sensitivity. Acta Ophthalmol 2008; 86 (6): 609-13**.**
Does not address any key questions

Schappert-Kimmijser, J A five-year follow-up of subjects with intra-ocular pressure of 22-30 mm Hg without anomalies of optic nerve and visual field typical for glaucoma at first investigation. Ophthalmologica 71; 162 (4): 289-95**.**
Does not address any key questions

Scherrer, M., Fleischhauer, J. C., Helbig, H., Johann Auf Der Heide, K., and Sutter, F. K. P Comparison of tendency-oriented perimetry and dynamic strategy in octopus perimetry as a screening tool in a clinical setting: A prospective study. Klin. Monatsbl. Augenheilkd. 2007; 224 (4): 252-254**.**

Does not use clinical assessment as reference standard

Schiefer, U., Pascual, J., Sample, P., Edmunds, B., Weleber, R., Johnson, C., Staubach, F., Lagreze, W., Vonthein, R., and Paetzold, J Comparison of the New "German Adaptive Threshold Estimation" (GATE) Strategy With Conventional Static Threshold Estimating Perimetry and With the SITA Procedure. IOVS 2007; 48 : ARVO E-Abstract 4452**.**

Does not address any key questions

Schimiti, Rui Barroso, Arcieri, Enyr Saran, Avelino, Rodrigo Rezende, Matsuo, Tiemi, and Costa, Vital Paulino. Full threshold vs. Swedish interactive threshold algorithm (SITA) em pacientes glaucomatosos submetidos a perimetria computadorizada pela primeira vez. Arq. bras. oftalmol 2006; 69 (2): 145-150.

Foreign language

Schlote, T. and Landenberger, H [Intraocular pressure difference in Goldmann applanation tonometry versus a transpalpebral tonometer TGDc-01"PRA" in glaucoma patients]. Klin Monbl Augenheilkd 2005; 222 (2): 123-31**.**

Does not address any key questions

Schlottmann, P. G., Shewry, J. M., White, E. T., Ikeji, F. C., and Garway-Heath. Comparison of the GDx VCCc, HRT II, Stratus OCT, RTA and Discam for the Detection of Glaucomatous Visual Field Defects. IOVS 2006; 47 : ARVO E-abstract 3627.

Abstract only

Schmeisser, E. T. and Smith, T. J Flicker visual evoked potential differentiation of glaucoma. Optom Vis Sci 92; 69 (6): 458-62**.**

Does not address any key questions

Schneider, E. and Grehn, F Intraocular pressure measurement-comparison of dynamic contour tonometry and goldmann applanation tonometry. J Glaucoma 2006; 15 (1): 2-6**.**

Data not abstractable

Schulzer, M., Drance, S. M., and Douglas, G. R A comparison of treated and untreated glaucoma suspects. Ophthalmology 91; 98 (3): 301-7**.**

Does not address any key questions

Schulzer, M., Mikelberg, F. S., and Drance, S. M Some observations on the relation between intraocular pressure reduction and the progression of glaucomatous visual loss. Br J Ophthalmol 87; 71 (7): 486-8**.**

Does not address any key questions

Schulzer, M Errors in the diagnosis of visual field progression in normal-tension glaucoma. Ophthalmology 94; 101 (9): 1589-94; discussion 1595**.**

Does not address any key questions

Schuman, J. S., Wollstein, G., Farra, T., Hertzmark, E., Aydin, A., Fujimoto, J. G., and Paunescu, L. A Comparison of optic nerve head measurements obtained by optical coherence tomography and confocal scanning laser ophthalmoscopy. Am J Ophthalmol 2003; 135 (4): 504-12**.**

Unspecified diagnosis of Glaucoma

Schwartz, R., Draeger, J., Wirt, H., Rumberger, E., Dauper, J., and Deutsch, C [Clinical value of new tonometers]. Fortschr Ophthalmol 90; 87 (1): 41-4.

Foreign language

Screening for glaucoma. Br Med J 73; 3 (5879): 511-2**.**

Does not address any key questions

Screening for glaucoma. Br Med J 73; 3 (5879): 511-2**.**

No original data (e.g., systematic review, narrative review, editorial, letter)

Sehi, M., Pinzon-Plazas, M., Feuer, W. J., and Greenfield, D. S Relationship between pattern electroretinogram, standard automated perimetry, and optic nerve structural assessments. J Glaucoma 2009; 18 (8): 608-17**.**

Does not address any key questions

Seitzman, G., Katz, J., and Robin, A. L. COMPARING OCULUS EASYFIELD PERIMETRY WITH FREQUENCY DOUBLING TEST AND HUMPHREY SITA-STANDARD PERIMETRY. American Academy of Ophthalmology 2001; : 160.

Abstract only

Shaikh, A. and Salmon, J. F The role of scanning laser polarimetry using the GDx variable corneal compensator in the management of glaucoma suspects. Br J Ophthalmol 2006; 90 (12): 1454-7**.**

Does not address any key questions

Shehzad, M. S., Ashraf, K. M., Siddique, M., Qazi, Z. A., and Khan, M. T Comparison between Clinical Evaluations, Stereoscopic Photographic analysis and Confocal Scanning Laser Ophthalmoscope in estimating Cup/Disc Ratio. J. Pak. Med. Assoc. 2003; 53 (6): 225-228**.**

Does not address any key questions

Shewry, J. M, Ikeji, F. C, White, E. T, Schlottmann, P. G, and Garway-Heath, D. F. Comparison of the Test-Retest Variability of Neuroretinal Rim Area Measurements in Normal and Glaucoma Patients Using RTA and OCT3. IOVS 2005; 46 : ARVO E-abstract 4821.

Abstract only

Shin, I. H., Kang, S. Y., Hong, S., Kim, S. K., Seong, G. J., Tak, M. K., and Kim, C. Y Comparison of OCT and HRT findings among normal, normal tension glaucoma, and high tension glaucoma. Korean J Ophthalmol 2008; 22 (4): 236-41**.**

Does not address any key questions

Shiose, Y., Kitazawa, Y., Tsukahara, S., Akamatsu, T., Mizokami, K., Futa, R., Katsushima, H., and Kosaki, H Epidemiology of glaucoma in Japan--a nationwide glaucoma survey. Jpn J Ophthalmol 91; 35 (2): 133-55**.**

Does not address any key questions

Shiose, Y., Kitazawa, Y., Tsukahara, S., Akamatsu, T., Mizokami, K., Futa, R., Katsushima, H., and Kosaki, H Epidemiology of glaucoma in Japan--a nationwide glaucoma survey. Jpn J Ophthalmol 91; 35 (2): 133-55**.**

Other (specify): prevalence

Shirakashi, M., Iwata, K., Sawaguchi, S., Abe, H., and Nanba, K Intraocular pressure-dependent progression of visual field loss in advanced primary open-angle glaucoma: a 15-year follow-up. Ophthalmologica 93; 207 (1): 1-5**.**

Does not address any key questions

Shunmugam, M. and Azuara-Blanco, A The quality of reporting of diagnostic accuracy studies in glaucoma using the Heidelberg retina tomograph. Invest Ophthalmol Vis Sci 2006; 47 (6): 2317-23**.**

No original data (e.g., systematic review, narrative review, editorial, letter)

Siebert, M., Gramer, E., and Serguhn, S [High mean pallor value--a risk factor for deterioration of the visual field in glaucoma and ocular hypertension. A pilot study using the optic nerve head analyzer]. Der Ophthalmologe : Zeitschrift der Deutschen Ophthalmologischen Gesellschaft 95; 92 (4): 506-10.

Foreign language

Sihota, R., Sony, P., Gupta, V., Dada, T., and Singh, R Comparing glaucomatous optic neuropathy in primary open angle and chronic primary angle closure glaucoma eyes by optical coherence tomography. Ophthalmic Physiol Opt 2005; 25 (5): 408-15**.**

It does not address the adequate population

Sihota, R., Srinivasan, G., Dada, T., Gupta, V., Ghate, D., and Sharma, A Is the ISNT rule violated in early primary open-angle glaucoma--a scanning laser tomography study. Eye (Lond) 2008; 22 (6): 819-24**.**

Testing in-house scoring system only

Sim, D. H., Goh, L. G., and Ho, T Glaucoma pattern amongst the elderly Chinese in Singapore. Ann Acad Med Singapore 98; 27 (6): 819-23**.**

Does not address any key questions

Singh, G. D, Kavanaugh, J., Paris, G. R, and McKinnon, S. J. COMPARISON OF CHROMATIC FREQUENCY DOUBLING PERIMETRY AND THE SITA-STANDARD HUMPHREY VISUAL FIELD. American Academy of Ophthalmology 2001; : 159.

Abstract only

Skorin, L. Jr, Multack, R. F., and Holtzman, J. N Health fair glaucoma screening: follow-up evaluation. J Am Osteopath Assoc 91; 91 (7): 671-4**.**

Does not address any key questions

Skorkovska, K., Skorkovska, S., Michalek, J., Koci, J., and Synek, S [Structural analysis of the optic nerve head in healthy eyes and in eyes with glaucoma]. Cesk Slov Oftalmol 2004; 60 (6): 400-7.

Foreign language

Skorkovska, S., Michalek, J., Sedlacik, M., Maskova, Z., and Koci, J [Correlation of the Heidelberg retinal tomograph, evaluation of the retinal nerve fiber layer and perimetry in the diagnosis of glaucoma]. Cesk Slov Oftalmol 2007; 63 (6): 403-14.

Foreign language

Smith, D. A. and Trope, G. E New-generation portable tonometers: comparison of the Keta and Goldmann tonometers. Can J Ophthalmol 89; 24 (7): 308-10**.**

Does not address any key questions

Soliman, M. A., de Jong, L. A., Ismaeil, A. A., van den Berg, T. J., and de Smet, M. D Standard achromatic perimetry, short wavelength automated perimetry, and frequency doubling technology for detection of glaucoma damage. Ophthalmology 2002; 109 (3): 444-54**.**

Data not abstractable

Soliman, M. A., Van Den Berg, T. J., Ismaeil, A. A., De Jong, L. A., and De Smet, M. D Retinal nerve fiber layer analysis: relationship between optical coherence tomography and red-free photography. Am J Ophthalmol 2002; 133 (2): 187-95**.**

Infrequently used device: OLD OCT 2000

Sommer, A., Katz, J., Quigley, H. A., Miller, N. R., Robin, A. L., Richter, R. C., and Witt, K. A Clinically detectable nerve fiber atrophy precedes the onset of glaucomatous field loss. Arch Ophthalmol 91; 109 (1): 77-83**.**

Does not address any key questions

Sommer, A., Miller, N. R., Pollack, I., Maumenee, A. E., and George, T The nerve fiber layer in the diagnosis of glaucoma. Arch Ophthalmol 77; 95 (12): 2149-56**.**

Does not address any key questions

Sommer, A., Miller, N. R., Pollack, I., Maumenee, A. E., and George, T The nerve fiber layer in the diagnosis of glaucoma. Arch Ophthalmol 77; 95 (12): 2149-56**.**

Other (specify): is not screening

Sommer, A., Pollack, I., and Maumenee, A. E Optic disc parameters and onset of glaucomatous field loss. II. Static screening criteria. Arch Ophthalmol 79; 97 (8): 1449-54**.**

Does not address any key questions

Sommer, A Glaucoma screening: too little, too late?. J Gen Intern Med 90; 5 (5 Suppl): S33-7**.**

Does not address any key questions

Sommer, A Glaucoma screening: too little, too late?. J Gen Intern Med 90; 5 (5 Suppl): S33-7**.**

Other (specify): ***REFERENCE*Summary no new data

Sorensen, P. N., Nielsen, N. V., and Norskov, K Ocular hypertension. A 15-year follow-up. Acta Ophthalmol (Copenh) 78; 56 (3): 363-72**.**

Does not address any key questions

Sponsel, W. E, Orcutt, J. C, Heuer, D. K, Brennan, M. W, and Trigo, Y AAO/VFW Screening Results 1998-2001: Frequency Doubling vs Tonometry for Detection of Glaucomatous Field Loss and Optic Neuropathy. American Academy of Ophthalmology 2002; : 139.

Abstract only

Sponsel, W. E., Paris, G., Trigo, Y., and Pena, M IOP, POBF, and Visual Responses to Unoprostone and Latanoprost in Open Angle Glaucoma. American Glaucoma Society 2002; : 57.

Abstract only

Spry, P. G., Henson, D. B., Sparrow, J. M., and North, R. V Quantitative comparison of static perimetric strategies in early glaucoma: test-retest variability. Journal of glaucoma 2000; 9 (3): 247-53**.**

Does not address any key questions

Spry, P. G., Hussin, H. M., and Sparrow, J. M Clinical evaluation of frequency doubling technology perimetry using the Humphrey Matrix 24-2 threshold strategy. Br J Ophthalmol 2005; 89 (8): 1031-5**.**

Does not address any key questions

Stefan, C., Dumitrica, D. M., Tebeanu, E., Cristea, I., Sapundgieva, A., Dragomir, L., Cerbulescu, B., and Gheorghieva, V [Macular involvement in glaucoma]. Oftalmologia 2008; 52 (3): 98-101.

Foreign language

Stein, D. M., Ishikawa, H., Hariprasad, R., Wollstein, G., Noecker, R. J., Fujimoto, J. G., and Schuman, J. S A new quality assessment parameter for optical coherence tomography. Br J Ophthalmol 2006; 90 (2): 186-90**.**

Does not address any key questions

Stein, J., Girkin, C. A, Harizman, N., Arthur, S., Chiang, A., Ortega, J. D, Liebmann, J. M, Tello, C., and Ritch, R A Comparison of False-Positive Test Results Between the Stratus OCT III and the GDx-VCC. IOVS 2005; 46 : ARVO E-abstract 3635.

Abstract only

Stoutenbeek, R. and Jansonius, N. M Glaucoma screening during regular optician visits: can the population at risk of developing glaucoma be reached?. Br J Ophthalmol 2006; 90 (10): 1242-4**.**

Does not address any key questions

Stoutenbeek, R., de Voogd, S., Wolfs, R. C., Hofman, A., de Jong, P. T., and Jansonius, N. M The additional yield of a periodic screening programme for open-angle glaucoma: a population-based comparison of incident glaucoma cases detected in regular ophthalmic care with cases detected during screening. Br J Ophthalmol 2008; 92 (9): 1222-6**.**

Other (specify):

Strouthidis, N. G., Scott, A., Peter, N. M., and Garway-Heath, D. F Optic disc and visual field progression in ocular hypertensive subjects: detection rates, specificity, and agreement. Invest Ophthalmol Vis Sci 2006; 47 (7): 2904-10**.**

Does not address any key questions

Stroux, A., Martus, P., Budde, W., Horn, F., Junemann, A., Korth, M., and Jonas, J. B Sequential classification in glaucoma diagnosis. Graefes Arch Clin Exp Ophthalmol 2003; 241 (4): 277-83**.**

Data not abstractable

Su, D. H., Wong, T. Y., Wong, W. L., Saw, S. M., Tan, D. T., Shen, S. Y., Loon, S. C., Foster, P. J., and Aung, T Diabetes, hyperglycemia, and central corneal thickness: the Singapore Malay Eye Study. Ophthalmology 2008; 115 (6): 964-968.e1**.**

Does not address any key questions

Sugimoto, M., Ito, K., Goto, R., and Uji, Y Symmetry analysis for detecting early glaucomatous changes in ocular hypertension using optical coherence tomography. Jpn J Ophthalmol 2004; 48 (3): 281-6**.**

Data not abstractable

Sugimoto, M., Ito, K., Goto, R., and Uji, Y Symmetry analysis for detecting early glaucomatous changes in ocular hypertension using optical coherence tomography. Jpn J Ophthalmol 2004; 48 (3): 281-6**.**

Does not address any key questions

Sung, V. C., Koppens, J. M., Vernon, S. A., Pawson, P., Rubinstein, M., King, A. J., and Tattersall, C. L Longitudinal glaucoma screening for siblings of patients with primary open angle glaucoma: the Nottingham Family Glaucoma Screening Study. Br J Ophthalmol 2006; 90 (1): 59-63**.**

Does not address any key questions

Suzanna J•nior R, Takahashi WY, Almada AT, Hirai A. Degrau nasal de roenne. Seu estudo no glaucoma cronico simples. Rev. Bras. Oftalmol 1981; 40(4):290-3.

Foreign language

Suzuki, Y., Yamamoto, T., Araie, M., Iwase, A., Tomidokoro, A., Abe, H., Shirato, S., Kuwayama, Y., Mishima, H. K., Shimizu, H., Tomita, G., Inoue, Y., and Kitazawa, Y [Tajimi Study review]. Nippon Ganka Gakkai Zasshi 2008; 112 (12): 1039-58.

Foreign language

Swamy, B., Cumming, R. G., Ivers, R., Clemson, L., Cullen, J., Hayes, M. F., Tanzer, M., and Mitchell, P Vision screening for frail older people: a randomised trial. The British journal of ophthalmology 2009; 93 (6): 736-41**.**

Does not address any key questions

Swamy, B., Cumming, R. G., Ivers, R., Clemson, L., Cullen, J., Hayes, M. F., Tanzer, M., and Mitchell, P Vision screening for frail older people: a randomised trial. The British journal of ophthalmology 2009; 93 (6): 736-41**.**

It does not address the adequate population

Tafreshi, A., Racette, L., Weinreb, R. N., Sample, P. A., Zangwill, L. M., Medeiros, F. A., and Bowd, C Pattern electroretinogram and psychophysical tests of visual function for discriminating between healthy and glaucoma eyes. Am J Ophthalmol 2010; 149 (3): 488-95**.**

Infrequently used device: electroretinogram

Takahashi, G., Aoki, Y., Koike, T., Nakano, T., Kitahara, K., Demirel, S., and Johnson, C. A. The Influence of Instruction on Frequency Doubling Technology Perimetry and Humphrey Matrix Results in Normals and Early Glaucoma Patients. IOVS 2005; 46 : ARVO E-abstract 2482.

Abstract only

Takahashi, H., Goto, T., Shoji, T., Tanito, M., Park, M., and Chihara, E Diabetes-associated retinal nerve fiber damage evaluated with scanning laser polarimetry. Am J Ophthalmol 2006; 142 (1): 88-94**.**

Data not abstractable

Tan, J. C. and Hitchings, R. A Optimizing and validating an approach for identifying glaucomatous change in optic nerve topography. Invest Ophthalmol Vis Sci 2004; 45 (5): 1396-403**.**

Does not address any key questions

Tan, J. C., Poinoosawmy, D., and Hitchings, R. A Tomographic identification of neuroretinal rim loss in high-pressure, normal-pressure, and suspected glaucoma. Invest Ophthalmol Vis Sci 2004; 45 (7): 2279-85**.**

Does not address any key questions

Tan, O., Chopra, V., Lu, A. T., Schuman, J. S., Ishikawa, H., Wollstein, G., Varma, R., and Huang, D Detection of macular ganglion cell loss in glaucoma by Fourier-domain optical coherence tomography. Ophthalmology 2009; 116 (12): 2305-14.e1-2**.**

Does not address any key questions

Tan, O., Li, G., Lu, A. T., Varma, R., and Huang, D Mapping of macular substructures with optical coherence tomography for glaucoma diagnosis. Ophthalmology 2008; 115 (6): 949-56.

Does not address any key questions

Tatemichi, M., Nakano, T., Tanaka, K., Hayashi, T., Nawa, T., Miyamoto, T., Hiro, H., and Sugita, M Possible association between heavy computer users and glaucomatous visual field abnormalities: a cross sectional study in Japanese workers. J Epidemiol Community Health 2004; 58 (12): 1021-7.

Does not address any key questions

Tatemichi, M., Nakano, T., Tanaka, K., Hayashi, T., Nawa, T., Miyamoto, T., Hiro, H., Iwasaki, A., and Sugita, M Performance of glaucoma mass screening with only a visual field test using frequency-doubling technology perimetry. Am J Ophthalmol 2002; 134 (4): 529-37.

Data not abstractable

Tchabi, S., Doutetien, C., Amoussouga, A., Babagbeto, M., Lawani, R., Deguenon, J., and Bassabi, S. K [Intraocular pressure in the Benin: screening for primary open-angle glaucoma.]. J Fr Ophtalmol 2005; 28 (6): 623-6.

Foreign language

Teesalu, P., Airaksinen, P. J., and Tuulonen, A Blue-on-yellow visual field and retinal nerve fiber layer in ocular hypertension and glaucoma. Ophthalmology 98; 105 (11): 2077-81.

Does not address any key questions

Teesalu, P., Vihanninjoki, K., Airaksinen, P. J., and Tuulonen, A Hemifield association between blue-on-yellow visual field and optic nerve head topographic measurements. Graefes Arch Clin Exp Ophthalmol 98; 236 (5): 339-45.

Does not address any key questions

Teesalu, P., Vihanninjoki, K., Airaksinen, P. J., Tuulonen, A., and Laara, E Correlation of blue-on-yellow visual fields with scanning confocal laser optic disc measurements. Invest Ophthalmol Vis Sci 97; 38 (12): 2452-9.

Does not address any key questions

Teixeira RMB, Satyro U, Almeida HGd. Reprodutibilidade da topografia do disco £ptico. Rev. Bras. Oftalmol 2003; 62(6):430-5

Foreign language

Teixeira, Roberto M. B, Almeida, Homero GusmPo de, and Garcia, Danielle C. S. Perimetria de FreqnWncia Dobrada (Frequency Doubling Technology - FDT) e o Campo Visual Computadorizado (Humphrey Field Analiser - HFA). Rev. bras. oftalmol 2004; 63 (4): 251-257.

Foreign language

Thomas, R., Bhat, S., Muliyil, J. P., Parikh, R., and George, R Frequency doubling perimetry in glaucoma. J Glaucoma 2002; 11 (1): 46-50.

It does not address the adequate population

Thomas, R., Parikh, R., George, R., Kumar, R. S., and Muliyil, J Five-year risk of progression of ocular hypertension to primary open angle glaucoma. A population-based study. Indian J Ophthalmol 2003; 51 (4): 329-33.

Does not address any key questions

Thomas, R., Parikh, R., Muliyil, J., Bhat, S., and George, R Validation of test duration as a screening criterion for frequency doubling perimetry. Am J Ophthalmol 2004; 137 (3): 562-3.

Infrequently used device: duration of test

Thulasiraj, R. D., Nirmalan, P. K., Ramakrishnan, R., Krishnadas, R., Manimekalai, T. K., Baburajan, N. P., Katz, J., Tielsch, J. M., and Robin, A. L Blindness and vision impairment in a rural south Indian population: the Aravind Comprehensive Eye Survey. Ophthalmology 2003; 110 (8): 1491-8.

Does not address any key questions

Tielsch, J. M., Sommer, A., Katz, J., Royall, R. M., Quigley, H. A., and Javitt, J Racial variations in the prevalence of primary open-angle glaucoma: The Baltimore eye survey. J. AM. MED. ASSOC. 91; 266 (3): 369-374.

Does not address any key questions

Tjon-Fo-Sang, M. J., De Vries, J., and Lemij, H. G Measurement by nerve fiber analyzer of retinal nerve fiber layer thickness in normal subjects and patients with ocular hypertension. AM. J. OPHTHALMOL. 96; 122 (2): 220-227.

Does not address any key questions

Toker, M. I., Vural, A., Erdogan, H., Topalkara, A., and Arici, M. K Central corneal thickness and Diaton transpalpebral tonometry. Graefes Arch Clin Exp Ophthalmol 2008; 246 (6): 881-9.

Does not address any key questions

Tong, L. T., Lai, M. M., Azen, S. P., and Varma, R Screening for glaucoma and other ocular disease using SITA standard and full threshold Humphrey visual field tests: The Los Angeles Latino Eye Study (LALES). IOVS 2002; 43 : ARVO E-abstract 2177.

Abstract only

Tonkin, D The early diagnosis of glaucoma. Med J Aust 66; 2 (23): 1112-5.

Data not abstractable

Topouzis, F., Harris, A., Wilson, M. R., Koskosas, A., Founti, P., Yu, F., Anastasopoulos, E., Pappas, T., and Coleman, A. L Increased likelihood of glaucoma at the same screening intraocular pressure in subjects with pseudoexfoliation: the Thessaloniki Eye Study. Am J Ophthalmol 2009; 148 (4): 606-613.e1.

Does not address any key questions

Topouzis, F., Wilson, M. R., Harris, A., Anastasopoulos, E., Yu, F., Mavroudis, L., Pappas, T., Koskosas, A., and Coleman, A. L Prevalence of open-angle glaucoma in Greece: the Thessaloniki Eye Study. Am J Ophthalmol 2007; 144 (4): 511-9.

Does not address any key questions

Toth, M., Kothy, P., and Hollo, G Accuracy of scanning laser polarimetry, scanning laser tomography, and their combination in a glaucoma screening trial. J Glaucoma 2008; 17 (8): 639-46.

Other (specify): normal population was not evaluated with complete exam

Toth, M., Kothy, P., Vargha, P., and Hollo, G Accuracy of combined GDx-VCC and matrix FDT in a glaucoma screening trial. J Glaucoma 2007; 16 (5): 462-70.

Data not abstractable

Touboul, D., Roberts, C., Kerautret, J., Garra, C., Maurice-Tison, S., Saubusse, E., and Colin, J Correlations between corneal hysteresis, intraocular pressure, and corneal central pachymetry. J Cataract Refract Surg 2008; 34 (4): 616-22.

Does not address any key questions

Townsend, K. A., Wollstein, G., Danks, D., Sung, K. R., Ishikawa, H., Kagemann, L., Gabriele, M. L., and Schuman, J. S Heidelberg Retina Tomograph 3 machine learning classifiers for glaucoma detection. Br J Ophthalmol 2008; 92 (6): 814-8**.**

Non-commercially available analysis of data

Trapani LF. OCT y nuevas tqcnicas diagn£sticas en la evaluaci£n del glaucoma. OSL, Oftalmol. St. LucÆa 2009; 8(2):38-52.

Foreign language

Troost, A., Grunz, C., Troost, R., Grus, F. H., Pfeiffer, N., and Schwenn, O [Agreement between clinical evaluation, Heidelberg-Retina-Tomograph (HRT) and Nerve Fiber Analyzer (GDx) in glaucoma diagnosis]. Klin Monbl Augenheilkd 2004; 221 (9): 757-61.

Foreign language

Tuck, M. W. and Crick, R. P Efficiency of referral for suspected glaucoma. BMJ 91; 302 (6783): 998-1000**.**

Does not examine candidate screening tests for glaucoma

Tuck, M. W. and Crick, R. P Relative effectiveness of different modes of glaucoma screening in optometric practice. Ophthalmic Physiol Opt 93; 13 (3): 227-32**.**

Does not examine candidate screening tests for glaucoma

Tuck, M. W. and Crick, R. P Screening for glaucoma: age and sex of referrals and confirmed cases in England and Wales. Ophthalmic Physiol Opt 92; 12 (4): 400-4**.**

Does not address any key questions

Tuck, M. W. and Crick, R. P Screening for glaucoma: the time taken by primary examiners to conduct visual field tests in practice. Ophthalmic Physiol Opt 94; 14 (4): 351-5**.**

Does not address any key questions

Turno-Krecicka, A., Nizankowska, M. H., and Pacholska, D [Results of screening for primary glaucoma from data in materials from the Medical Diagnostic Center DOLMED in Wroclaw]. Klin Oczna 97; 99 (3): 179-83.

Foreign language

Tzamalis, A., Kynigopoulos, M., Schlote, T., and Haefliger, I Improved reproducibility of retinal nerve fiber layer thickness measurements with the repeat-scan protocol using the Stratus OCT in normal and glaucomatous eyes. Graefes Arch Clin Exp Ophthalmol 2009; 247 (2): 245-52**.**

Does not address any key questions

Ugurlu, S., Hoffman, D., Garway-Heath, D. F., and Caprioli, J Relationship between structural abnormalities and short-wavelength perimetric defects in eyes at risk of glaucoma. Am J Ophthalmol 2000; 129 (5): 592-8**.**

Does not address any key questions

Vajaranant, T. S., Price, M. O., Price, F. W., Wilensky, J. T., and Edward, D. P Intraocular pressure measurements following Descemet stripping endothelial keratoplasty. Am J Ophthalmol 2008; 145 (5): 780-6**.**

Does not address any key questions

Varma, D. K., Artes, P. H., Nicolela, M. T., LeBlanc, R. P., and Chauhan, B. C Comparison of Three Psychophysical Tests for Detecting Glaucomatous Visual Field Progression. IOVS 2003; : ARVO E-abstract 43.

Abstract only

Ventura MP, Vianna RNG, Solari HP, Yamane R. Eletrorretinograma com est Æmulo padrPo (PERG) no diagn£stico do glaucoma inicial. Rev. Bras. Oftalmol 2002; 61(10):703-13.

Foreign language

Ventura, M. P., Solari, H. P., Alonso, R. S., and Ambrosio, R. Jr. Standard Achromatic Perimetry, Short Wavelength Automated Perimetry, and Pattern Electroretinography in the Diagnosis of Early Glaucoma. IOVS 2006; 47 : ARVO E-abstract 4013.

Abstract only

Vernon, S. A. and Ghosh, G Do locally agreed guidelines for optometrists concerning the referral of glaucoma suspects influence referral practice?. Eye 2001; Vol15 (4): 458-463**.**

Does not address any key questions

Vernon, S. A. and Ghosh, G Do locally agreed guidelines for optometrists concerning the referral of glaucoma suspects influence referral practice?. Eye 2001; Vol15 (4): 458-463**.**

Does not examine candidate screening tests for glaucoma

Vernon, S. A., Henry, D. J., Cater, L., and Jones, S. J Screening for glaucoma in the community by nonophthalmologically trained staff using semi automated equipment. EYE 90; 4 (1): 89-97**.**

Other: not all subjects clinically evaluated

Vernon, S. A., Henry, D. J., Cater, L., and Jones, S. J Screening for glaucoma in the community by nonophthalmologically trained staff using semi automated equipment. EYE 90; 4 (1): 89-97**.**

Other: Not all subjects evaluated with exam

Vihanninjoki, K., Teesalu, P., Burk, R. O., Laara, E., Tuulonen, A., and Airaksinen, P. J Search for an optimal combination of structural and functional parameters for the diagnosis of glaucoma. Multivariate analysis of confocal scanning laser tomograph, blue-on-yellow visual field and retinal nerve fiber layer data. Graefes Arch Clin Exp Ophthalmol 2000; 238 (6): 477-81**.**

Non-commercially available analysis of data

Vijaya, L., George, R., Baskaran, M., Arvind, H., Raju, P., Ramesh, S. V., Kumaramanickavel, G., and McCarty, C Prevalence of primary open-angle glaucoma in an urban south Indian population and comparison with a rural population. The Chennai Glaucoma Study. Ophthalmology 2008; 115 (4): 648-654.e1**.**

Does not address any key questions

Vimolchalao, N., Fontana, H., Hoffman, D. C., and Caprioli, J Comparison of Frequency Doubling Perimetry (Humphrey Matrix) to Short Wave Length Automated Perimetry for the Early Detection of Glaucoma. IOVS 2006; 47 : ARVO E-abstract 3992.

Abstract only

Vistamehr, S., Shelsta, H. N., Palmisano, P. C., Filardo, G., Bashford, K., Chaudhri, K., Forster, S. H., Shafranov, G., and Bruce Shields, M Glaucoma screening in a high-risk population. J Glaucoma 2006; 15 (6): 534-40**.**

Data not abstractable

Vitale, S., Smith, T. D., Quigley, T., Kerrigan-Baumrind, T. A., Pease, T. E., Varma, R., Friedman, T. S., Katz, J., and Tielsch, J. M Screening performance of functional and structural measurements of neural damage in open-angle glaucoma: a case-control study from the Baltimore Eye Survey. J Glaucoma 2000; 9 (5): 346-56.
Does not examine candidate screening tests for glaucoma

Vodovozov, A. M. and Boriskina, L. N [Significance of intolerance indicators in glaucoma]. Oftalmol Zh 85; (1): 36-8.
Foreign language

Vulsteke, C., Stalmans, I., Fieuws, S., and Zeyen, T Correlation between ocular pulse amplitude measured by dynamic contour tonometer and visual field defects. Graefes Arch Clin Exp Ophthalmol 2008; 246 (4): 559-65.
Data not abstractable

Wadood, A. C, Azuara-Blanco, A., Taguri, A., King, A. J W, and Aspinall, P Sensitivity and specificity of program C-20 of frequency doubling technology (FDT), tendency oriented perimetry (TOP) and SITA-Fast (HSF) in glaucoma. IOVS 2001; 42 : ARVO Abstract 794.
Non-commercially available analysis of data

Wadood, A. C., Azuara-Blanco, A., Aspinall, P., Taguri, A., and King, A. J Sensitivity and specificity of frequency-doubling technology, tendency-oriented perimetry, and Humphrey Swedish interactive threshold algorithm-fast perimetry in a glaucoma practice. Am J Ophthalmol 2002; 133 (3): 327-32.
It does not address the adequate population

Wakakura, M., Kageyama, M., Hamanaka, T., Shimizu, K., Joshita, H., Shimizu, T., Baba, H., Kisara, M., and Miyata, M [Application of oculokinetic perimetry in examination of the eye]. Nippon Ganka Gakkai Zasshi 96; 100 (7): 551-7.
Foreign language

Walker, W. M Ocular hypertension. Follow-up of 109 cases from 1963 to 1974. Trans Ophthalmol Soc U K 74; 94 (2): 525-34.
Does not address any key questions

Wall, M. and Jennisch, C. S Random dot motion stimuli are more sensitive than light stimuli for detection of visual field loss in ocular hypertension patients. Optom Vis Sci 99; 76 (8): 550-7.
Does not address any key questions

Wall, M. and Ketoff, K. M Random dot motion perimetry in patients with glaucoma and in normal subjects. Am J Ophthalmol 95; 120 (5): 587-96.
Does not address any key questions

Wang, N., Lai, M., Cheng, X., and Ye, T [Ultrasound biomicroscopic dark room provocative test]. [Zhonghua yan ke za zhi] Chinese journal of ophthalmology 98; 34 (3): 183-6, 12.
Foreign language

Wang, Y. X., Xu, L., Zhang, R. X., and Jonas, J. B Frequency-doubling threshold perimetry in predicting glaucoma in a population-based study: The Beijing Eye Study. Arch Ophthalmol 2007; 125 (10): 1402-6.
Does not use clinical assessment as reference standard

Wang, Y., Xu, L., and Jonas, J. B Prevalence and causes of visual field loss as determined by frequency doubling perimetry in urban and rural adult Chinese. Am J Ophthalmol 2006; 141 (6): 1078-1086.
Does not address any key questions

Wanger, P. and Persson, H. E Pattern-reversal electroretinograms and high-pass resolution perimetry in suspected or early glaucoma. OPHTHALMOLOGY 87; 94 (9): 1098-1103.
Does not address any key questions

Wanger, P. and Persson, H. E Pattern-reversal electroretinograms and high-pass resolution perimetry in suspected or early glaucoma. OPHTHALMOLOGY 87; 94 (9): 1098-1103.
Does not examine candidate screening tests for glaucoma

Weih, L. M., Nanjan, M., McCarty, C. A., and Taylor, H. R Prevalence and predictors of open-angle glaucoma: results from the visual impairment project. Ophthalmology 2001; 108 (11): 1966-72.
Does not address any key questions

Weinreb, R. N., Shakiba, S., and Zangwill, L Scanning laser polarimetry to measure the nerve fiber layer of normal and glaucomatous eyes. Am J Ophthalmol 95; 119 (5): 627-36.
Does not address any key questions

Weinreb, R. N., Zangwill, L., Berry, C. C., Bathija, R., and Sample, P. A Detection of glaucoma with scanning laser polarimetry. Arch Ophthalmol 98; 116 (12): 1583-9.
Other (specify): outdated device

Weinreb, R. N., Zangwill, L., Berry, C. C., Bathija, R., and Sample, P. A Detection of glaucoma with scanning laser polarimetry. Arch Ophthalmol 98; 116 (12): 1583-9.
Other (specify): Outdated device

Wells, A. P., Garway-Heath, D. F., Poostchi, A., Wong, T., Chan, K. C., and Sachdev, N Corneal hysteresis but not corneal thickness correlates with optic nerve surface compliance in glaucoma patients. Invest Ophthalmol Vis Sci 2008; 49 (8): 3262-8.
Does not address any key questions

Werner, D. L. and Field, S A mammoth vision screening--public relations and public service. J Am Optom Assoc 82; 53 (9): 731-7.
Does not address any key questions

Westcott, M. C., Fitzke, F. W., and Hitchings, R. A Abnormal motion displacement thresholds are associated with fine scale luminance sensitivity loss in glaucoma. Vision Res 98; 38 (20): 3171-80.
Does not address any key questions

Wild, J. M., Moss, I. D., Whitaker, D., and O'Neill, E. C The statistical interpretation of blue-on-yellow visual field loss. Invest Ophthalmol Vis Sci 95; 36 (7): 1398-410.
Does not address any key questions

Wild, J. M., Pacey, I. E., Hancock, S. A., and Cunliffe, I. A Between-algorithm, between-individual differences in normal perimetric sensitivity: Full Threshold, FASTPAC, and SITA. Investigative Ophthalmology & Visual Science 99; 40 (6): 1152-1161.
Does not address any key questions

Wild, J. M., Pacey, I. E., Hancock, S. A., and Cunliffe, I. A Between-algorithm, between-individual differences in normal perimetric sensitivity: Full Threshold, FASTPAC, and SITA. Investigative Ophthalmology & Visual Science 99; 40 (6): 1152-1161.

It does not address the adequate population

Wilensky, J. T., Gieser, D. K., Dietsche, M. L., Mori, M. T., and Zeimer, R Individual variability in the diurnal intraocular pressure curve. Ophthalmology 93; 100 (6): 940-4.

Does not address any key questions

Wilensky, J. T., Podos, S. M., and Becker, B Prognostic indicators in ocular hypertension. Arch Ophthalmol 74; 91 (3): 200-2.

Does not address any key questions

Wilson, M. R Progression of visual field loss in untreated glaucoma patients and suspects in St Lucia, West Indies. Trans Am Ophthalmol Soc 2002; 100 : 365-410.

Does not address any key questions

Wishart, P. K., Wardrop, D. R., and Kosmin, A. S Is visual field evaluation using multiple correlations and linear regressions useful? An evaluation of Delphi perimetry. Graefes Arch Clin Exp Ophthalmol 98; 236 (7): 493-500.

Non-commercially available analysis of data

Wolfs, R. C. W., Borger, P. H., Ramrattan, R. S., Klaver, C. C. W., Hulsman, C. A. A., Hofman, A., Vingerling, J. R., Hitchings, R. A., and De Jong, P. T. V. M Changing views on open-angle glaucoma: Definitions and prevalences - The Rotterdam study. Invest. Ophthalmol. Vis. Sci. 2000; 41 (11): 3309-3320.

Does not address any key questions

Wolfs, R. C. W., Dielemans, I., Klaver, C. C. W., Vingerling, J. R., Hofman, A., and De Jong, P. T. V. M Prevalence of primary open-angle glaucoma among elderly people: The Rotterdam study: PREVALENTIE VAN PRIMAIR OPEN-KAMERHOEKGLAUCOOM BIJ OUDEREN: HET ERGO-ONDERZOEK. NED. TIJDSCHR. GENEESKD. 95; 139 (44): 2246-2251.

Foreign language

Wollstein, G., Garway-Heath, D. F., and Hitchings, R. A Identification of early glaucoma cases with the scanning laser ophthalmoscope. Ophthalmology 98; 105 (8): 1557-63.

Non-commercially available analysis of data

Wroblewski, D., Francis, B. A., Chopra, V., Kawji, A. S., Quiros, P., Dustin, L., and Massengill, R. K Glaucoma detection and evaluation through pattern recognition in standard automated perimetry data. Graefe's Arch. Clin. Exp. Ophthalmol. 2009; 247 (11): 1517-1530.

Non-commercially available analysis of data

Wu, J. S., Wang, D. B., and Wang, J. H [Reliability of successive automated static perimetry]. Zhonghua Yan Ke Za Zhi 2003; 39 (12): 731-5.

Foreign language

Xu, L., Chen, P. P., Chen, Y. Y., Takahashi, Y., Wang, L., and Mills, R. P Quantitative nerve fiber layer measurement using scanning laser polarimetry and modulation parameters in the detection of glaucoma. J Glaucoma 98; 7 (4): 270-7.

Does not address any key questions

Xu, L., Zhang, L., Xia, C. R., Li, J. J., Hu, L. N., Ma, K., Chen, Y. J., Fan, G. Z., Song, W. X., Shi, Y. Y., Zhang, S. Y., and Sun, B. C [The prevalence and its effective factors of primary angle-closure glaucoma in defined populations of rural and urban in Beijing.]. Zhonghua Yan Ke Za Zhi 2005; 41 (1): 8-14.

Foreign language

Yagci, R., Eksioglu, U., Midillioglu, I., Yalvac, I., Altiparmak, E., and Duman, S Central corneal thickness in primary open angle glaucoma, pseudoexfoliative glaucoma, ocular hypertension, and normal population. Eur J Ophthalmol 2005; 15 (3): 324-8.

Data not abstractable

Yalvac, I. S., Altunsoy, M., Cansever, S., Satana, B., Eksioglu, U., and Duman, S The correlation between visual field defects and focal nerve fiber layer thickness measured with optical coherence tomography in the evaluation of glaucoma. J Glaucoma 2009; 18 (1): 53-61.

Does not use clinical assessment as reference standard

Yalvac, I. S., Kulacoglu, D. N., Satana, B., Eksioglu, U., and Duman, S Correlation between optical coherence tomography results and the Scoring Tool for Assessing Risk (STAR) score in patients with ocular hypertension. Eur J Ophthalmol 2010; 20 (6): 1018-25.

Does not address any key questions

Yamada, N., Chen, P. P., Mills, R. P., Leen, M. M., Lieberman, M. F., Stamper, R. L., and Stanford, D. C Screening for glaucoma with frequency-doubling technology and Damato campimetry. Arch Ophthalmol 99; 117 (11): 1479-84.

Infrequently used devicecampimetry

Yamada, N., Chen, P. P., Mills, R. P., Leen, M. M., Stamper, R. L., Lieberman, M. F., Xu, L., and Stanford, D. C Glaucoma screening using the scanning laser polarimeter. J Glaucoma 2000; 9 (3): 254-61.

Other: gdx

Yamazaki, S., Baba, H., and Inoue, Y [Study of follow-up period and provocative tests for diagnosis of primary open-angle glaucoma]. Nippon Ganka Gakkai Zasshi 91; 95 (7): 692-7.

Foreign language

Yamazaki, Y., Mizuki, K., Hayamizu, F., and Tanaka, C Correlation of blue chromatic macular sensitivity with optic disc change in early glaucoma patients. Jpn J Ophthalmol 2002; 46 (1): 89-94.

Does not address any key questions

Yamazaki, Y., Tanaka, C., Hayamizu, F., and Mizuki, K [Correlation between blue chromatic macular sensitivity and optic disc change in early glaucoma patients]. Nippon Ganka Gakkai Zasshi 2001; 105 (11): 776-80.

Does not address any key questions

Yang, C. C., Wang, I. J., Chang, Y. C., Lin, L. L., and Chen, T. H A predictive model for postoperative intraocular pressure among patients undergoing laser in situ keratomileusis (LASIK). Am J Ophthalmol 2006; 141 (3): 530-536.

Does not address any key questions

Yip, L. W. and Mikelberg, F. S A comparison of the glaucoma probability score to earlier heidelberg retina tomograph data analysis tools in classifying normal and glaucoma patients. J Glaucoma 2008; 17 (7): 513-6.
Non-commercially available analysis of data

Yoshiyama, K. K. and Johnson, C. A WHICH METHOD OF FLICKER PERIMETRY IS MOST EFFECTIVE FOR DETECTION OF GLAUCOMATOUS VISUAL FIELD LOSS?. American Academy of Optometry 96; : 25.
Infrequently used device

Young, I. M., Rait, J. L., Guest, C. S., Carson, C. A., and Taylor, H. R Comparison between Fastpac and conventional Humphrey perimetry. Aust N Z J Ophthalmol 94; 22 (2): 95-9.
Does not address any key questions

Zafar, S., Makornwattana, M., Gurses-Ozden, R., Vessani, R. M., Liebmann, J. M., Tello, C., and Ritch, R Scanning Protocol Choice Affects Optical Coherence Tomography (OCT-3) Measurements. IOVS 2003; : ARVO E-abstract 3361.
Abstract only

Zangwill, L. M, Weinreb, R. N, Beiser, J. A, Cioffi, G. A, Coleman, A. L, Trick, G., Liebmann, J. M, Kass, M. A, Gordon, M. O, and OHTS CSLO Ancillary Study Group. Baseline Topographic Optic Disc Measurements Are Associated With the Development of Primary Open Angle Glaucoma: The Confocal Scanning Laser Ophthalmoscopy Ancillary Study to the OHTS. IOVS 2005; 46 : ARVO E-abstract 3631.
Does not address any key questions

Zangwill, L. M., Berry, C. C., and Weinreb, R. N Optic disc topographic measurements after pupil dilation. Ophthalmology 99; 106 (9): 1751-5.
Does not address any key questions

Zangwill, L. M., Bowd, C., Berry, C. C., Williams, J., Blumenthal, E. Z., Sanchez-Galeana, C. A., Vasile, C., and Weinreb, R. N Discriminating between normal and glaucomatous eyes using the Heidelberg Retina Tomograph, GDx Nerve Fiber Analyzer, and Optical Coherence Tomograph. Arch Ophthalmol 2001; 119 (7): 985-93.
Infrequently used device: outdated devices

Zangwill, L. M., Chan, K., Bowd, C., Hao, J., Lee, T. W., Weinreb, R. N., Sejnowski, T. J., and Goldbaum, M. H Heidelberg retina tomograph measurements of the optic disc and parapapillary retina for detecting glaucoma analyzed by machine learning classifiers. Invest Ophthalmol Vis Sci 2004; 45 (9): 3144-51.
Non-commercially available analysis of data

Zangwill, L. M., van Horn, S., de Souza Lima, M., Sample, P. A., and Weinreb, R. N Optic nerve head topography in ocular hypertensive eyes using confocal scanning laser ophthalmoscopy. Am J Ophthalmol 96; 122 (4): 520-5.
Does not address any key questions

Zangwill, L. M., Weinreb, R. N., Beiser, J. A., Berry, C. C., Cioffi, G. A., Coleman, A. L., Trick, G., Liebmann, J. M., Brandt, J. D., Piltz-Seymour, J. R., Dirkes, K. A., Vega, S., Kass, M. A., and Gordon, M. O Baseline topographic optic disc measurements are associated with the development of primary open-angle glaucoma: The Confocal Scanning Laser Ophthalmoscopy Ancillary Study to the Ocular Hypertension Treatment Study. Arch. Ophthalmol. 2005; 123 (9): 1188-1197.
Does not address any key questions

Zangwill, L. M., Weinreb, R. N., Berry, C. C., Smith, A. R., Dirkes, K. A., Liebmann, J. M., Brandt, J. D., Trick, G., Cioffi, G. A., Coleman, A. L., Piltz-Seymour, J. R., Gordon, M. O., and Kass, M. A The confocal scanning laser ophthalmoscopy ancillary study to the ocular hypertension treatment study: study design and baseline factors. Am J Ophthalmol 2004; 137 (2): 219-27.
Does not address any key questions

Zangwill, L. M., Williams, J., Berry, C. C., Knauer, S., and Weinreb, R. N A comparison of optical coherence tomography and retinal nerve fiber layer photography for detection of nerve fiber layer damage in glaucoma. Ophthalmology 2000; 107 (7): 1309-15.
Does not address any key questions

Zangwill, L. M., Williams, J., Berry, C. C., Knauer, S., and Weinreb, R. N A comparison of optical coherence tomography and retinal nerve fiber layer photography for detection of nerve fiber layer damage in glaucoma. Ophthalmology 2000; 107 (7): 1309-15.
Other (specify): reliability only

Zelefsky, J. R., Harizman, N., Mora, R., Ilitchev, E., Tello, C., Ritch, R., and Liebmann, J. M Assessment of a race-specific normative HRT-III database to differentiate glaucomatous from normal eyes. J Glaucoma 2006; 15 (6): 548-51.
Does not use clinical assessment as reference standard

Zeppieri, M., Brusini, P., and Miglior, S Corneal thickness and functional damage in patients with ocular hypertension. Eur J Ophthalmol 2005; 15 (2): 196-201.
Does not address any key questions

Zhang, H., Xu, L., Chen, C., and Jonas, J. B Central corneal thickness in adult Chinese. Association with ocular and general parameters. The Beijing Eye Study. Graefes Arch Clin Exp Ophthalmol 2008; 246 (4): 587-92.
Does not address any key questions

Zhang, M. Z., Fu, Z. F., Liu, X. R., and Zheng, C [A comparison study of pulsitile ocular blood flow in normal eyes and primary open angle glaucoma]. Zhonghua Yan Ke Za Zhi 2004; 40 (4): 250-3.
Foreign language

Zhang, Y., Wu, L. L., and Yang, Y. F Potential of stratus optical coherence tomography for detecting early glaucoma in perimetrically normal eyes of open-angle glaucoma patients with unilateral visual field loss. J Glaucoma 2010; 19 (1): 61-5.
Other (specify): Not useful data

Zhao, J., Sui, R., Jia, L., and Ellwein, L. B [Prevalence of glaucoma and normal intraocular pressure among adults aged 50 years or above in Shunyi county of Beijing]. Zhonghua Yan Ke Za Zhi 2002; 38 (6): 335-9.
Foreign language

Zhong, Y., Ye, W., Gao, J., Yu, F., and Wang, K [Comparitive study of the threshold variability between blue-on-yellow perimetry and white-on-white perimetry]. Yan Ke Xue Bao 2002; 18 (2): 87-91.
Foreign language

Zubareva, T. V. and Zaretskaya, R. B [Value of some functional and tonometric methods of study for the early diagnosis of glaucoma]. Vestn Oftalmol 71; 4 : 26-9.
Foreign language

Appendix F. Included Devices

PERIMETRY (Device with Testing Algorithm)

Humphrey Field Analyzer	HFA Fastpac	HFA Full Threshold	HFA SITA-Standard	HFA SITA-Fast	HFA SWAP	HFA SITA-SWAP	HFA Unspecified white on white or static perimetry	HFA Unspecified SWAP	HFA Unspecified	HFA Other
Matrix FDT	FDT N-30	FDT C-20	FDT Full Threshold	FDT SITA	FDT Other	FDT Unspecified				
Octopus	300-TOP	300-White on White	300-SWAP	300-Unspecified	900-TOP	900-White on White	900-SWAP	900-Unspecified	Octopus other	

OPTICAL COHERENCE TOMOGRAPHY (OCT)

Zeiss Stratus	Stratus Optic Disc	Stratus RNFL	Stratus Fast Optic Disc	Stratus Fast RNFL	Stratus Unspecified	Stratus Other		
Zeiss Cirrus	Cirrus Optic Disc	Cirrus RNFL	Cirrus Unspecified	Cirrus Other				
Heidelberg	Spectralis Optic Disc	Spectralis RNFL	Spectralis Unspecified	Spectralis Other				
Optovue	RTVue Optic Disc	RTVue RNFL	RTVue GCC	RTVue Unspecified	RTVue Other			
Topcon	3D OCT-1000 Optic Disc	3D OCT-1000 RNFL	3D OCT-1000 Unspecified	3D OCT-1000 Other	3D OCT-2000 Optic Disc	3D OCT-2000 RNFL	3D OCT-2000 Unspecified	3D OCT-2000 Other

SCANNING LASER OPHTHALMOSCOPY (as HRT)

HRT	HRT II	HRT III

SCANNING LASER POLARIMETRY (as Gdx)

GDX	GDX-VCC	GDX-ECC

CONTACT AND NON-CONTACT TONOMETRY (Device details not abstracted)
DIRECT AND INDIRECT OPHTHALMOSCOPY (Device details not abstracted)
FUNDUS PHOTOGRAPHY (Device details not abstracted)